UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
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Stephan Mahfood, Director
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

Dear Mr. Mahfood:

We have completed our review of the revisions to the Missouri Water Quality Standards under Missouri's Code of State Regulations (CSR), Division 20, Chapter 7, which your Agency submitted for review and approval to the United States Environmental Protection Agency (EPA) in two separate submissions on April 14, 1994, and December 9, 1996, as required under federal regulations at 40 C.F.R. § 131.20.

Under Section 303(c) of the Clean Water Act (CWA), 33 U.S.C. § 1313(c), states are to submit revised or new water quality standards to EPA for review and approval no less frequently than every three years. Federal regulations at 40 C.F.R. §§ 131.20, 131.21 and 131.22 implement these requirements. Missouri's previous review and revision of its water quality standards regulations at 10 CSR 20-7.031 was completed and adopted by the Missouri Clean Water Commission (MCWC) on December 12, 1990. EPA approved the revisions on June 11, 1991.

The April 14, 1994, and December 9, 1996, submissions addressed by this letter consist of three separate revisions of water quality standards conducted by the Missouri Department of Natural Resources (MDNR) and adopted by the MCWC. The April 14, 1994, submission included a single revision to Chapter 7 adopted by the MCWC on December 16, 1993, and the December 9, 1996, submission included two separate revisions to Chapter 7 adopted by the MCWC on March 13, 1996, and June 25, 1996. As part of the review process, the MCWC held three public hearings to receive public input and comment on the proposed water quality standards revisions adopted on December 16, 1993, March 13, 1996, and June 25, 1996. EPA considers the State's December 9, 1996, submission of the two most recent revisions to the water quality standards to constitute the last triennial review. Based on our review, the State's public participation process is consistent with and satisfies the procedural requirements of 40 C.F.R. § 131.20. The State is presently preparing a comprehensive review of its water quality standards regulations at 10 CSR 20-7.031 which will serve as its next triennial review.

The State's adoption of a significantly larger number of numeric water quality criteria under this revision provides a greater level of protection for State waters and is consistent with the goals of the CWA. The addition of a number of stream segments and lakes to the classification of surface waters represents an expanded coverage of the waters of the State by the CWA and State water quality standards. EPA encourages the State to continue to expand the number of water bodies protected under the CWA, including the designation of all waters for the protection of aquatic life and whole body contact consistent with Section 101(a)(2) of the Act, 33 U.S.C. 1251 et seq.

SECTION I: ITEMS EPA IS NEITHER APPROVING NOR DISAPPROVING

Several provisions either adopted or revised by the State as part of its revisions of the water quality standards address the regulation of discharges to specific water bodies or types of water bodies. EPA considers these revisions to constitute permitting regulations rather than water quality standards regulations subject to EPA review and approval under authority at 40 C.F.R. §131.5. EPA is, therefore, taking no action under Section 303(c) of the CWA or federal regulations at 40 C.F.R. §131.5 with regard to the State adoption of these provisions. In its review of these specific revisions, EPA determined that all but one (i.e. 10 CSR 20-7.031(4)(P)) of the following provisions would not cause the State to take action which would potentially impair designated uses, violate federal water quality standards regulations or generally be inconsistent with the CWA.

A. Metropolitan No-Discharge Streams

Revisions to 10 CSR 20-7.031(6) would expand the application of the State's prohibition against the discharge of water contaminants to streams identified in Table F of the standards to the watersheds supporting those streams. The State also revised this provision to specifically identify the circumstances under which "existing interim discharges may be allowed until interceptors are available." Table F contains a listing of all Metropolitan No-Discharge Streams and was revised to include Pearson Creek in the Springfield area. These provisions are intended to be implemented in tandem with effluent regulations at 10 CSR 20-7.015(5).

B. Lake Taneycomo

State adoption of 10 CSR 20-7.031(9) is intended to codify the MCWC's "wishes to recognize the uniqueness of Lake Taneycomo...its importance as a trout fishery and as the central natural resource in the rapidly developing Branson area and threats to the lake's water quality imposed by development." This provision provides that more stringent approaches to the development of effluent rules, discharge permits and nonpoint source management plans and permits are to be employed regarding activities within the Lake Taneycomo watershed. The use of best treatment technology for point and nonpoint-source discharges in the Lake's watershed is also required. These provisions are intended to be implemented in tandem with effluent regulations at 10 CSR 20-7.015(3)(F).

C. Losing Streams

State adoption of 10 CSR 20-7.031(11) describes the timing of the process by which "losing streams" are identified, how permits addressing discharges to these or nearby streams are affected by such determinations and how existing facilities in proximity to these stream segments subsequently determined to be losing are to be regulated. Table J was also added to the standards and contains a listing of "losing streams" identified by MDNR. These provisions are intended to be implemented in tandem with effluent regulations at 10 CSR 20-7.015(4).

D. Effluent Regulations

In its 1993 action, MDNR proposed certain provisions pertaining to Effluent Regulations under 10 CSR 20-7.015. Provisions include: (1) the removal of the lagoon exemption from compliance with special bacteria discharge limitations; (2) the inclusion of phosphorous discharge limitations for Lake Taneycomo and tributaries; (3) the removal of small lagoon exemption for discharges to losing streams; (4) the incorporation by reference of Federal requirements for management of bio-solids; and, (4) the addition of Bypass prohibitions and requirements in anticipation of federal regulations (although not adopted in the MCWC's final action). While these provisions are not subject to EPA review and approval under the water quality standards regulations, we nonetheless commend the MDNR's actions in these areas.

E. Outstanding State Resource Waters

EPA acknowledges the addition of 24 new waters to Table E -Outstanding State Resource Waters (OSRWs) under 10 CSR 20-7.031 and the revision to one other previously listed water to extend the length of its designation. These OSRSs fall between Tier 2 and Tier 3. EPA accepts this additional tier because it is effectively a more stringent application of the Tier 2 provisions of the anti-degradation policy and, therefore, permissible under section 510 of the CWA, 33 U.S.C. 1251 et seq.

F. Specific Criteria

10 CSR 20-7.031 (4) Specific Criteria: (A) Application of Table A Values

The addition of the reference to Health Advisories (HA) levels listed in Table A of 10 CSR 20-7.031 under subsection (4)(A) states that the MDNR will use these values in "establishing discharge permit limits and management strategies until additional data becomes available to support alternative criteria, or other standards are established." With the exception of bis-2-chloroisopropyl ether, which is an EPA listed priority pollutant, these health advisory levels address pollutants for which there are no water quality criteria for the protection of human health under section 304(a) of the CWA nor, for that matter, Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act (SDWA). Rather, these values are derived from Health Advisories published by EPA under the Safe Drinking Water Act. Despite the absence of

federally recommended water quality criteria under the CWA or MCLs under the SDWA, the state saw fit to regulate these pollutants in order to be more protective of the Drinking Water Supply use. While the addition of the reference to HA levels is commendable, EPA cannot take any formal action to approve this addition because of the absence of federally recommended water quality criteria.

G. Groundwater

10CSR 20-7.031 (5)(A) Application of Table A Values

The addition of the reference to Health Advisory levels listed in Table A of 10 CSR 20-7.031 under section (5)(A) states that the MDNR will use these values in "establishing management strategies and ground water cleanup criteria, until additional data becomes available to support alternative criteria, or until other standards are established." This language is nearly identical to that adopted under subsection (4)(A) with regard to discharge permits and management strategies. Again, with the exception of bis-2-chloroisopropyl ether, which is an EPA listed priority pollutant, these health advisory levels address pollutants for which there are neither water quality criteria for the protection of human health under section 304(a) of the CWA nor Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act (SDWA). Rather, the values are derived from Health Advisories published by EPA under the SDWA. Because the CWA does not require state adoption of groundwater criteria, these pollutants would not otherwise be regulated under Missouri's water quality standards. While the EPA commends the state for adopting these values for use in ground water management activities and as clean-up criteria , which both address potential exposure to surface waters under the influence of ground water, the EPA cannot take any formal action to approve this addition because of the absence of federally recommended water quality criteria and because the CWA does not require state adoption of groundwater criteria.. Again, EPA acknowledges the state's effort to provide further protection to human health.

10 CSR 20-7031 (5)(C) Application of Table A Values to Aquifers

The State broadened the application of Table A values for the protection of ground water in aquifers under the State water quality standards by eliminating the reference to a vertical component under subsection (5)(C)1. and areal restrictions under subsection (5)(C)2. The effect of these revisions is to remove any limitation to the application of the water quality standards applicable to ground water to any part of an aquifer. Previous standards limited the application of criteria to a point at which ground water becomes waters of the State, which "will normally be at the next downgradient property boundary." Because the CWA does not require state adoption of ground water criteria nor defines ground water as a Water of the United States, the EPA cannot take formal action to approve this addition. Nevertheless, the EPA commends the state's effort to provide adequate protection of surface waters under the influence of ground water.

H. Drinking Water Supply

Missouri adopted a value of 90 ug/l for Bromochloromethane which the State relies upon to protect its Drinking Water Supply and Groundwater uses. EPA has not published section 304(a) water quality criteria nor promulgated MCLs for this pollutant. Once more, this value is less stringent than the current SDWA Health Advisory of 1.0 ug/l for this pollutant. Although we believe this value was adopted in error, EPA cannot take any formal action to disapprove this addition because of the absence of federally recommended water quality criteria.

I. 10 CSR 20-7.031(4)(P) WET Chronic Tests

This provision describes the manner in which whole effluent toxicity (WET) testing is to be conducted as part of the specific criteria applied to all classified waters. Subsection (1)(E), which defines chronic toxicity, relates that "chronic toxicity is also indicated by an overreach of WET test conditions of subsection (4)(P)". Hence, these tests serve to implement the definition of chronic toxicity as applied to effluent discharges. According to this provision, WET tests are to be conducted using "at least two representative, diverse species and provides that the State may interpret the results of such tests considering the potential for pollutant volatilization and bio-degradation in the mixing zone. This provision is principally a NPDES permits concern and therefore is not subject to EPA review and approval under Section 303(c).

Although EPA cannot take formal action to disapprove this addition, EPA does have the following comments concerning the application of this provision: Due to the lack of detailed implementation procedures, the prevention of toxicity to receiving waters on a case-by-case basis is not ensured and an impairment of uses may result. Current federal regulations at 40 C.F.R. §136 contain the testing methodology acceptable for purposes of determining compliance with WET permit limitations under the National Pollutant Discharge Elimination System (NPDES). This methodology specifies acceptable test species and testing conditions upon which compliance with NPDES permits are to be measured. The State could address this issue during the next triennial review of State WQSs by replacing language specifying species selection and the interpretation of test results with language specifically referencing methods at 40 C.F.R. §136 for WET testing. Alternatively, the State could also develop it's own procedures detailing the implementation of this provision.

SECTION II: ITEMS EPA IS APPROVING

Under Section 303(c) of the CWA, the EPA administrator is charged with reviewing and approving or disapproving state-adopted water quality standards. In order to determine if new or revised state water quality standards are consistent with the federal regulations and the CWA, pursuant to EPA regulations at 40 C.F.R. § 131.5 and 131.6, EPA must review the water quality standards and determine: 1) whether the state has designated beneficial uses for water bodies that are consistent with the goals of CWA Section 101(a)(2), and if not, whether the state has conducted a use attainability analysis to justify its designation, see 40 C.F.R. § 131.10; 2)

whether water quality criteria were adopted to protect designated uses; 3) whether the state has adopted water quality standards according to its legal procedures; 4) whether state standards that do not include designated beneficial uses consistent with CWA Section 101(a)(2) were developed in a scientifically appropriate manner; and 5) whether the state submission includes minimum requirements for water quality standards submissions to EPA. The following items are new or revised provisions which EPA is approving:

A. Definitions

The following definitions were revised to clarify the meaning or added to update the reference to applicable guidance or regulations for particular terms within the State water quality standards. These new and/or revised definitions outlined below are consistent with the CWA, federal regulations implementing water quality standards, and EPA guidance or policy and are hereby approved:

10 CSR 20-7.031 Water Quality Standards
(1) Definitions
(A) Acute toxicity;
(B) Aquifer;
(C) Beneficial water uses;
7. Human health protection (Fish consumption and secondary contact recreation);
12. Wetlands (deleted from 1991 standards)
12. Storm- and flood-water storage and attenuation (assumes the position formerly occupied by Wetlands in the 1991 standards);
13. Habitat for resident and migratory wildlife species, including rare and endangered species;
14. Recreational, cultural, educational, scientific and natural aesthetic values and uses;
15. Hydrologic cycle maintenance;
(D) Biocriteria;
(E) Chronic toxicity;
(F) Classified waters,
3. Class L3 - Other lakes;
7. Class W;
(G) Ecoregion;
(H) Geometric mean;
(L) Losing stream;
(M) Low-flow conditions;
(P) Outstanding state resource waters;
(R) Reference stream reaches;
(S) Waters of the State (deleted from 1991 standards);

(T) Water hardness (assumed the position formerly occupied by "Waters of the State" in the 1991 standards);
(X) Wetlands (moved from (W) to (X); current definition was refined or expanded.

B. Antidegradation

10 CSR 20-7.031 (2) Antidegradation, (A) and (B)

The State revised its antidegradation policy to provide more specificity regarding the three levels of protection required under federal regulation at 40 C.F.R. §131.12. Subsection (2)(A) of the State's antidegradation policy which describes the protection of high quality waters (i.e., Tier 2) was revised and moved to an added subsection (2)(B). Subsection (2)(A) under the effective water quality standards now describes the protection of existing uses under Missouri's antidegradation policy (i.e., Tier 1). Subsection (2)(C) was added to contain the existing language describing the protection of existing water quality in outstanding state resource waters and outstanding national resource waters (i.e., Tier 3). The adopted revisions are consistent with federal regulations at 40 C.F.R. §131.12 and constitute an improvement in the State's policy by clarifying the application of the three tiered levels of protection to waters of the United States within Missouri. These provisions are approved as this approach is consistent with EPA regulation and guidance with respect to antidegradation policy and represents an improvement over past antidegradation policies.

C. General Criteria

10 CSR 20-7.031 (3) General Criteria, (D)

The State revised its General Criteria, which serve as the narrative water quality criteria or "free froms" within Missouri's water quality standards, by modifying the provision under subsection (D) which prohibits substances or conditions in sufficient amounts to "have a harmful effect on human, animal or aquatic life" to instead prohibit substances or conditions in sufficient amounts to "result in toxicity to human, animal or aquatic life." This revision clarifies and allows for a more precise interpretation of this provision and is consistent with the CWA and 40 C.F.R. §131.11(b)(2) and is hereby approved. Other harmful effects, beyond toxicity, are covered elsewhere under Missouri's General Criteria.

10 CSR 20-7.031 (3) General Criteria, (G) and (H)

The State revised its General Criteria to add a provision under subsection (G) which prohibits "physical, chemical or hydrologic changes that would impair the natural biological community." The State also added a provision under subsection (H) which prohibits placing miscellaneous debris and solid waste into the waters of the State. These provisions are consistent with the CWA, federal regulations at 40 C.F.R. §131.11(b)(2) and clarify the level of protection provided all waters of the state under its General Criteria and are hereby approved.

D. Specific Criteria

10 CSR 20-7.031 (4) Specific Criteria

The introductory narratives under section (4), Specific Criteria, were revised to add provisions qualifying the protection of the drinking water supply, the whole-body contact recreation and the livestock and wildlife watering uses previously included under the General Criteria at subsection (3)(D) 1 and 2. The movement of these provisions from section (3) to section (4) did not involve any change to the original language and is hereby approved.

10 CSR 20-7.031 (4)(A)(3) Exceptions to the Application of Specific Criteria to Non-Point Sources of Pollution

In its revisions to its water quality standards, the State removed a provision under subsection (4)(A)(3) which provided an exception to the application of the Specific Criteria in Tables A and B where a "stream or lake is subjected to degradation due to nonpoint sources of pollution above the level of control which can be achieved through the use of feasible and cost-effective best management practices...". This exception to the application of the State's numeric water quality criteria was not based on any scientific justification, would not protect designated uses and was not consistent with the CWA. Although certain activities might not be subject to the application of certain controls under state or federal law, all "waters of the U.S." must be protected under the State's water quality standards such that their designated uses are protected. The removal of this exception by the State eliminates this inconsistency with the CWA and is hereby approved.

10 CSR 20-7.031 (4)(A)5.A Mixing Zones

Revisions to the State's mixing zone provisions in subsection (4)(A)6.A of the 1991 standards included modifying the exemption from the chronic toxicity requirements for surface waters within mixing zones to provide an exemption for these waters from the chronic criteria requirements instead. This revision to the State's mixing zone provisions is consistent with section 101(a)(3) of the CWA which prohibits toxicity in the "waters of the U.S.". As mixing zones are limited areas within surface water segments in which numeric water quality criteria may be exceeded as long as the designated uses of the segment are protected, the exemption should apply to the application of the appropriate criteria rather than to toxicity. The CWA is clear that there is to be no toxicity in surface waters. Given the proper placement and sizing of mixing zones and recognizing all three components of water quality criteria design (i.e., magnitude of exposure, averaging period of exposure, frequency of exceedence), pollutant concentrations can exceed applicable criteria without causing toxicity (TSD, 1991). For mixing zones and zones of initial dilution, the chronic and acute criteria, respectively, can be exceeded without causing chronic or acute toxicity if these areas are properly placed and limited in size. This subsection was renumbered to (4)(A)5.A and is approved.

Also within this subsection, the State modified its mixing zone provisions to add language exempting thermal mixing zones from the application of the mixing zone size criteria described under subsection (4)(A)5. Criteria for determining thermal mixing zone size were moved to a new subsection (4)(D)6. This revision is approved.

10 CSR 20-7.031(4)(A)5.B.(I)(a) Mixing Zones for Class C Streams and Streams with 7Q10 Low Flows of 0.1 cfs or Less

Revisions to the State's mixing zone provisions in subsection (4)(A)6.B.(I)(a). of the 1991 standards included reducing the mixing zone length for discharges to these streams from one-half mile to one-quarter mile. This revision to the State's mixing zone regulations is an improvement in the level of protection afforded these streams; however, there is a caveat regarding this provision which should be addressed during the next triennial review of the State's WQS. EPA's concern is discussed further in Section IV of this letter under the heading of "Mixing Zones for Class C Streams and Streams with 7Q10Low Flows of 0.1 cfs or Less". Notwithstanding EPA's overall concern with this provision, the reduction of the mixing zone length specified in this subsection, which was also renumbered to (4)(A)5.B.(I)(a), is approved.

10 CSR 20-7.031(4)(A) 5. B.(III)(a) Mixing Zones for Streams with 7Q10 Low Flows of Greater Than 20 cfs

The State modified its mixing zone provisions, contained in the 1991 standards at 10 CSR 20-7.031(4)(A) 6.B. (III), to remove reference to thermal mixing zones and, specifically, restrictions on their length. Criteria for determining thermal mixing zone size were moved to a new subsection of the 1996 standards at 10 CSR 20-7.31(4)(D)6. This revision is approved.

10 CSR 20-7.031(4)(A)5.B.(III)(b) Zones of Initial Dilution for Streams with 7Q10 Low Flows of Greater Than 20 cfs

The provision at subsection (4)(A)6.B.(III)b. addressing restrictions to the size of zones of initial dilution (ZIDs) for discharges to these streams was modified to further restrict the volume of dilution available within the ZID. Previous regulatory language restricts dilution within ZIDs to one-tenth of the mixing zone width, cross-section or volume. The added language further restricts the volume available for dilution within the ZID to "no more than ten times the effluent design flow volume unless the use of diffusers or specific mixing zone studies can justify more dilution." This subsection was also renumbered to (4)(A)5.B.(III)(b) and is approved.

10 CSR 20-7.031(4)(A)5.B.(IV)(b) Zones of Initial Dilution for Lakes

The provision at subsection (4)(A)6.B.(IV)b. addressing restrictions to the size of zones of initial dilution (ZIDs) for discharges to lakes was modified to eliminate the use of ZIDs in these waters. This subsection was also renumbered to (4)(A)5.B.(IV)(b) and is approved.

10 CSR 20-7.031(4)(A)5.D. Further Restrictions to the Application of Mixing Zones

The MDNR has revised its mixing zone regulations under the subsections identified below to provide more clarification and appropriate protectiveness to aquatic resources of the State. These provisions are approved as they are consistent with federal regulations at 40 C.F.R. § 131.13 and current EPA guidance regarding mixing zones.

Provisions at (4)(A)6.D. described receiving water characteristics and conditions which would justify further restricting the "size and location of mixing zones" beyond what was described at (4)(A)6.B. The State modified these provisions to allow the prohibition of mixing zones under the specified characteristics or conditions. The State also expanded the characteristics and conditions justifying the further restrictions to include "potential effects on mouths of tributary streams" and "proximity to water supply intakes." This subsection was also renumbered to (4)(A)5.D and is approved.

10 CSR 20-7.031(4)(B)1. Toxic Substances

Provisions at (4)(B)1. described the use of effluent toxicity studies or site-specific instream biological studies to develop alternate effluent limits not based on State-adopted pollutant-specific water quality criteria. The State removed this language and adopted alternative language which exclusively reflects EPA guidance on site-specific criteria development, including approaches such as the Water Effects Ratio approach supported by EPA. This revision also includes specific language which provides for State consideration of EPA guidance. This revision removed a provision which could be used to develop effluent limitations inconsistent with federal regulation and effective State standards, clarifies the State's use of site-specific criteria and is consistent with EPA guidance and regulation. This revision is approved.

10 CSR 20-7.031(4)(C) Fecal Coliform Bacteria

As discussed earlier, the introductory narratives under subsection (4), Specific Criteria, were revised to add provisions addressing the protection of the drinking water supply, the whole-body contact recreation and the livestock and wildlife watering uses previously included under the General Criteria at subsection (3)(D) 1 and 2. Subsection (4)(C) was revised to duplicate the portion of this introductory narrative addressing whole body contact. The duplication of this provision addressing the protection of the whole body contact use in subsection (4)(C) did not involve any change to the original language earlier in this subsection and is hereby approved.

10 CSR 20-7.031(4)(C) Fecal Coliform Bacteria

The State removed provisions at (4)(C)1. and 2. describing the data requirements supporting determinations of potential and verified noncompliance with the State criteria for fecal coliform bacteria. This language specified that a geometric mean of a minimum number of ambient samples was to serve as the basis for determinations of noncompliance. The removal of

this language, in combination with the existing provision at (4)(C), would indicate that the State's fecal coliform criterion are to be applied as maximum or "not to be exceeded" values. EPA believes this approach will protect the whole body contact use. This revision is approved.

10 CSR 20-7.031(4)(D) Temperature

The State revised its water quality criteria for temperature for general and limited warm-water fisheries, cool-water fisheries and cold-water fisheries at subsections (4)(D)1, 2 and 3. These revisions added language expanding the application of these criteria to "physical alteration of the water course" in addition to the previously listed "water contaminant sources." These revisions result in an expanded level of protection afforded surface waters from activities which might raise ambient water temperatures above levels which support aquatic life. These revisions are approved.

The State also revised provisions at (4)(D)5. by removing language specifying the allowed size of the thermal mixing zone. Thermal mixing zone specifications were also moved from subsection (4)(A)6.B.(III)a. and, together with the language removed from subsection (4)(D)5., placed in a newly created subsection (4)(D)6 with no substantive change to the language itself. These revisions to the thermal mixing specifications did, however, include a change in the provisions governing thermal mixing zone length. Previously, thermal mixing zone length was restricted to one-quarter mile and mixing zone width to one-quarter of the stream width or cross-sectional area under provisions at subsection (4)(A)6.B.(III)a. The added language specifies that "lengths and widths within rivers, and all plume dimensions within lakes, shall be determined on a case-by-case basis and shall be based on physical and biological surveys when appropriate." This provision provides for site-specific determinations of thermal mixing dimensions, is more scientifically defensible, is more likely to provide protection for aquatic life at specific sites and is consistent with the CWA. This revision is approved.

10 CSR 20-7.031(4)(L) Sulfate and Chloride Limit for Protection of Aquatic Life

The State revised portions of its Specific Criteria addressing sulfate and chloride under subsection (4)(L). Specific reference to the presence of chloride criteria within 10 CSR 20-7.031 at Table A was added to this subsection at (4)(L)1. This reference to the chloride criteria in Table A recognizes a "layer" of protection for aquatic life and human health additional to that provided by the combined sulfate and chloride criteria included at subsection (4)(L). This revision is approved.

Subsection (4)(L) was further revised at (4)(L)2. to provide that determinations of natural background concentrations of total sulfate plus chloride, which serves as the basis for aquatic life criteria for streams with a 7Q10 flow greater than 1 cfs, are to be determined at the 60Q10 stream design flow. The previous standards specified the use of the 60Q2 stream design flow in the determination of natural background concentrations of total sulfate and chloride. This revision will provide improved protection of aquatic life through the application of a more conservative stream design flow in the determination of criteria based on natural concentrations of sulfate and chloride. EPA believes this provision adequately protects aquatic life uses because: (1) it will

provide improved protection of aquatic life through the application of a more conservative stream design flow in the determination of criteria based on natural concentrations of sulfate and chloride; (2) this revision constitutes an improvement in the level of protection afforded aquatic life; (3) the criteria specific to chloride are based on EPA guidance; and, (3) EPA has no criteria for total sulfate and chloride. This revision is approved.

10 CSR 20-7.031(4)(M) Carcinogenic Substances

This subsection was revised to include a reference to the risk assumptions upon which the State's water quality criteria for carcinogenic substances are based. For carcinogenic pollutants, the water quality criteria which are designed to protect human health based on fish consumption are risk-based and are derived using specific assumptions of exposure (i.e., amounts of water and fish consumed). Water quality criteria for carcinogenic pollutants designed to protect surface waters designated for use as a drinking water supply may be based solely on a similar risk assessment or may be based on MCLs promulgated by EPA under the authority of the Safe Drinking Water Act (SDWA). The SDWA considers risk to human health, but also integrates the capabilities of pollutant removal technologies and pollutant removal costs into the identification of MCLs. This revision identifies applicable risk assumptions integral to the calculation of certain criteria for the protection of human health and assists the public in its understanding and review of the State's water quality standards. This revision is approved. EPA encourages the State to adopt water quality criteria for the protection of the drinking water supply use which are solely risk-based. Risk-based criteria for human health for carcinogens are published by EPA under section 304(a) of the CWA.

10 CSR 20-7.031(4)(Q) Biocriteria

The CWA has as its objective "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The State of Missouri revised its water quality standards to explicitly recognize the need to protect the biological integrity of the waters of the U.S. In the late 1980s, EPA identified state adoption of narrative biological criteria as a water quality standards program priority, consistent with the objective of the CWA. EPA believes that the adoption of narrative biological criteria, in association with the adoption of more biologically-based aquatic life use descriptions, by states and authorized tribes, are necessary steps to the development and adoption of numeric biological criteria. The narrative biocriteria adopted by the State at subsection (4)(Q) state that "The biological integrity of waters ...shall not be significantly different from reference waters." Determinations of "biological status" based on biological indices and ecoregionally-based reference conditions are consistent with current science and EPA guidance and will provide more complete protection of the State's aquatic life uses. This provision is approved.

10 CSR 20-7.031 Table B

The addition of the footnote to Table B clarifying that the ammonia criteria are expressed as total ammonia is approved.

E. Outstanding State Resource Waters

Revisions to 10 CSR 20-7.031(8) broadened the criteria by which waters are determined to qualify as Outstanding State Resource Waters (OSRW). The criteria were expanded to include waters "which are leased or held in perpetual easement for conservation purposes by a state, federal or private conservation agency or organization." Previously, OSRWs were limited to waters which were located on or passed through state- or federally-owned lands. The expansion of the application of this higher level of protection afforded these important waters is consistent with the CWA and is approved.

F. Water Quality Criteria

Adoption of 103 Criteria for 80 Pollutants to Protect Aquatic Life and Public Health

MDNR's revisions to 10 CSR 20-7.031 Table A added new numerical water quality criteria and made modifications to existing numerical criteria for the protection of aquatic life uses and human health protection. These numeric water quality criteria revisions (see enclosure, Table 1) result in criteria that are as stringent as EPA guidance criteria under Section 304(a) of the CWA or standards promulgated under the SDWA and are hereby approved. New or revised criteria that are disapproved by EPA are discussed in Section III (a) of this letter and listed in Table 3 of the enclosure.

EPA is approving ten water quality criteria for the protection of aquatic life for selenium, aluminum, chloride, chlorine, oil and grease, sulfate plus chloride and sulfide-hydrogen sulfide. With the exception of the State-adopted criteria for oil and grease and sulfate plus chloride, all the State-adopted criteria are as stringent or more stringent than those criteria for the protection of aquatic life published by EPA under section 304(a) of the CWA. EPA has not published guidance water quality criteria for oil and grease or for sulfate plus chloride, but believes that the State-adopted criteria are protective of aquatic life and are approved. EPA is also approving the State's removal of its criterion for the protection of aquatic life against chronic exposures to silver. Since EPA's removal of its own guidance chronic criterion for silver in 1992, EPA has had no chronic criterion for silver. EPA continues to evaluate the data currently available regarding the chronic toxicity of silver to aquatic life. Until EPA publishes a guidance chronic criterion for silver, the State should rely on its general water quality criteria to protect against chronic toxicity to aquatic life from exposures to silver in surface waters.

The State has added new water quality criteria or revised existing criteria for the protection of human health through the consumption of fish for 25 pollutants. These State-adopted criteria are equal to or more stringent than the guidance criteria published by EPA under authority at section 304(a) of the CWA, are protective of human health and are approved.

EPA is also approving 70 State water quality criteria for the protection of the State's Drinking Water Supply use which are based on either the maximum contaminant level (MCL) promulgated by EPA under authority of the Safe Drinking Water Act or CWA section 304(a) guidance water quality criteria for the protection of human health through exposures to

contaminants in water and fish. Where the State has adopted the MCL and EPA has published a more stringent water quality criterion for the protection of human health through the consumption of drinking water under section 304(a) of the CWA, EPA will approve the MCL-based criterion if the State has also adopted a water quality criterion for the protection of human health through the consumption of fish which is equivalent to or more stringent than the comparable criterion published under section 304(a) of the CWA. The MCL-based criterion does not provide protection to human health comparable to the section 304(a) criterion because it accounts for exposures to contaminants only through the consumption of water. The section 304(a) criterion accounts for contaminant exposures through both water and fish consumption. As the State applies its fish consumption criteria to all classified waters, the combination of the fish consumption criterion with the MCL-based criterion provides protection for Missouri's Drinking Water Supply use equivalent to that provided by criteria published for this use under section 304(a) of the CWA. EPA is also approving Missouri's adoption of 52 Health Advisories which the State relies upon to protect its Drinking Water Supply and Groundwater uses until MCLs are promulgated or section 304(a) criteria are published by EPA for those pollutants. EPA has not promulgated MCLs nor published guidance water quality criteria for these pollutants, but we believe that the State's application of Health Advisories developed by EPA under the SDWA to its surface waters provides an improved level of protection for human health and is approved.

G. Designated Cold-Water Sport Fisheries, Table C

In revising its water quality standards, the State added 22 steams and modified its classification of 4 streams as Cold-Water Sport Fisheries (CWF) as listed in Table C to 10 CSR 20-7.031. Bender Creek (Texas County), Bryant Creek (Douglas County), Cedar Creek (Newton County), Dogwood Creek (Stone County), Hickory Creek (Newton County), Hobbs Hollow (Stone County), Horse Creek (Dent County), Hunter Creek (Douglas County), Hurricane Creek (Oregon County), Indian Creek (Stone County), Joyce Creek (Barry County), Little Sinking Creek (Dent County), Maramec Spring Branch (Phelps County), Mill Creek (Maries County), Shoal Creek (Newton County), Spring Creek (Douglas County), Spring Creek (Oregon County), Stone Mill Spring Branch (Pulaski County), Turkey Creek (Ozark County), Turnback Creek (Dade and Lawrence Counties), Warm Fork Spring River (Oregon County) and Woods Fork Bull Creek (Christian County) were added to Table C. The State also expanded the coverage of the CWF designation for Crane Creek (Stone and Lawrence Counties), Eleven Point River (Oregon County), Little Piney Creek (Phelps County) and Spring River (Lawrence County) within Table C. These actions constitute an improvement in the water quality protection afforded these waters consistent with 40 C.F.R. §131.10(h)(1) and is approved.

H. Designated Beneficial Uses, Tables G and H

The use designations adopted by the State for the lakes and streams listed respectively in Tables 2.1 and 2.2 of the enclosures to this letter are consistent with the CWA and federal regulations and are approved. The addition of new stream segments and lakes, splitting of existing segments that result in either a gain or no net loss of coverage, added use designations, increases in a stream segment length or lake acreage, corrections to coordinates, and name

changes, as noted in Tables 2.1 and 2.2, are approved. Revisions adopted by the State which are not consistent with the CWA or implementing federal regulations are discussed later in this letter and are listed in Tables 4.1 and 4.2 of the enclosures.

I. Biocriteria Reference Locations

Table I of 10 CSR 20-7.031 was adopted into the State's water quality standards and contains a listing of biocriteria reference locations. This table is referenced in subsection (4)(Q). These waters serve as the basis for determinations regarding the protection of biological integrity as part of the State's narrative biological criteria. The adoption of this table into State water quality standards is approved.

SECTION III (a): ITEMS EPA IS DISAPPROVING

The following new and revised provisions of 10 CSR 20-7.031 have been identified as being inconsistent with the CWA:

A. Specific Criteria

10 CSR 20-7.031(4) Specific Criteria

wetlands

In its 1993 revisions to its water quality standards, the State modified the application of its existing designated use criteria for classified waters of the State by eliminating the application thereof to wetlands adjacent to classified waters. This revision results in a reduction in the level of protection afforded "waters of the U.S." and is inconsistent with the requirements of the CWA.

As part of its proposed revisions to the State's water quality standards in 1993, the MDNR included water quality standards specific to wetlands. These provisions were consistent with EPA guidance and regulation and represented a major improvement in the manner by which wetlands are afforded protection under state standards. Since the MDNR was proposing to adopt specific water quality standards for wetlands, including specifications for the application of water quality criteria to wetlands, the MDNR proposed to delete the original reference to the application of existing designated use criteria to wetlands adjacent to classified waters. However, the Missouri Clean Water Commission deleted the provisions addressing wetland water quality standards and adopted the proposed deletion of the provision that addressed the application of existing designated use criteria to adjacent wetlands. Consequently, the resultant exclusion of wetlands adjacent to classified waters from the application of existing designated use criteria represents a significant reduction in the level of protection afforded the State's wetlands. This revision is not consistent with the CWA and federal regulations and is hereby disapproved. The State can address this disapproval by restoring the language removed in 1993, clarify that State water quality standards are applicable to all wetlands which are waters of the

U.S. and specify how those standards are to be applied to wetlands. Unless the state takes action within 90 days of receipt of this letter to revise these provisions as recommended, EPA will propose replacement federal water quality standards consistent with section 304(a) of the CWA.

10 CSR 20-7.031 (4)(A)(3) Exceptions to the Application of Specific Criteria to Streams with Natural Concentrations of Dissolved Oxygen Below Criteria

Subsection (4)(A)(3) provides an exception to the application of the State's Specific Criteria to streams when natural upstream concentrations of dissolved oxygen are below the applicable criteria. This provision requires that, under these circumstances, wasteload allocations and permits be designed to meet the existing natural dissolved oxygen concentrations. EPA has issued a policy on the development of site-specific water quality criteria based on natural conditions (Memo from Tudor Davies, November 5,1997). Site-specific water quality criteria for the protection of aquatic life based on natural conditions is not necessarily inconsistent with the CWA or federal regulations, however, State regulations do not include a clear definition of what constitutes "natural" concentrations nor has the State developed or adopted detailed procedures which describe how this provision is to be implemented. The State must provide for the opportunity for EPA review and approval of the adoption of individual site-specific water quality criteria or, alternatively, develop detailed implementation procedures which EPA can review and approve to ensure that these site-specific water quality criteria are protective of the aquatic life uses in each instance they are applied.

This provision was modified as part of the State's 1993 revision of its water quality standards and is, therefore, subject to review and approval by EPA under section 303(c)(3) of the CWA. As presently designed, this provision would not ensure that site-specific water quality criteria based on "natural" conditions would protect aquatic life and does not provide for appropriate review and approval by EPA. The State has not provided any scientific information indicating that criteria based on this provision will protect this designated use as required at 40 C.F.R. §131.6(c). States may adopt criteria as numerical values based on CWA section 304(a) guidance, section 304(a) guidance modified to reflect site-specific conditions or other scientifically defensible methods (40 C.F.R. §131.11(b)(1)). This provision is hereby disapproved. The state may correct this deficiency by revising 10 CSR 20-7.031 (4)(A)(3) to clarify that background concentrations are due only to non-anthropogenic sources. Second, the state may further correct this deficiency by developing and adopting detailed procedures which describe how site-specific criteria are to be based on natural conditions and submit them to EPA for approval consistent with 40 C.F.R. §131.13., or specify that such determinations will result in the formal adoption of site specific water criteria for DO based on natural conditions and submission to EPA for approval. Unless the state takes action within ninety days of receipt of this letter to revise this provision as recommended, EPA will propose ambient dissolved oxygen concentrations under Section 304(a)(1) of the Clean Water Act as replacement federal water quality standards.

10 CSR 20-7.031(4)(B)2.B. Use of Dissolved Metals Criteria for the Drinking Water Supply Use

The State added subsection (4)(B)2.B. to specify that water quality criteria for metals supporting the Drinking Water Supply designated use are to be expressed as dissolved metals. Current EPA guidance expresses water quality criteria for metals as dissolved metals only for the protection of aquatic life. The State's expression of water quality criteria for metals as dissolved metals for the protection of human health through the consumption of both organisms and water is not consistent with EPA guidance and represents a less protective approach. The State has not provided any scientific information indicating that criteria based on this provision will protect this designated use as required at 40 C.F.R. §131.6(c). States may adopt criteria as numerical values based on CWA section 304(a) guidance, section 304(a) guidance modified to reflect site-specific conditions or other scientifically defensible methods (40 C.F.R. §131.11(b)(1)). Since the State provided no supporting scientific information regarding this approach to developing metals criteria for the protection of Drinking Water Supply, this provision is hereby disapproved. The State must either provide information consistent with 40 C.F.R. §131.6(c) or revise these criteria such that they are expressed as total recoverable metals. Unless the state takes action within 90 days of receipt of this letter to revise this provision as recommended, EPA will propose replacement federal numeric criteria for metals consistent with section 304(a) of the CWA.

B. Water Quality Criteria

MDNR's revisions to 10 CSR 20-7.031, Table A added or modified 36 criteria for the protection of aquatic life and human health for 13 pollutants (see enclosure, Table 3) which result in criteria that are not as stringent as EPA guidance criteria under Section 304(a) of the CWA or standards promulgated under the Safe Drinking Water Act (SDWA). Federal regulations at 40 C.F.R. §131.11 require that states adopt criteria which are based on sound scientific rationale and which are based on CWA section 304(a) guidance, CWA section 304(a) guidance modified to reflect site-specific conditions or other scientifically defensible methods. Because the State has adopted water quality criteria which are less stringent than section 304(a) criteria and has not provided adequate scientific justification supporting those criteria, EPA does not believe that the water quality criteria listed in the enclosure as Table 3 are protective of the appropriate designated uses. These criteria are are hereby disapproved.

Protection of Aquatic Life

EPA is disapproving 21 water quality criteria for the protection of aquatic life for cadmium, copper, lead, and zinc. Within 10 CSR 20-7.031, Table A, the State expresses acute and chronic water quality criteria for the protection of aquatic life for these metals based on three designated ranges of ambient water hardness. In addition, the State has developed aquatic life use-specific criteria for cadmium, copper and zinc. Although MDNR did not provide documentation on the methods and assumptions supporting the development of the use-specific

criteria recalculation from earlier standards revisions in the late 1980s. The EPA deduced from the files that MDNR performed a recalculation procedure generating criteria for the protection of aquatic life roughly based on an approach equivalent to EPA's Recalculation Procedure for site-specific criteria development (EPA Water Quality Standards Handbook, 1994). In that approach, aquatic species not resident to Missouri waters and species determined by MDNR to be absent from waters designated under the specific subcategories of aquatic life uses were deleted from the pollutant-specific toxicity database used to calculate water quality criteria. EPA has significant concerns with regard to how MDNR implemented this approach. In general, MDNR deviated from EPA's current site-specific development guidance by failing to correct existing data and add new toxicity data, where appropriate, prior to performing species deletions. Selective species deletions by MDNR, where evident, biases some final criteria calculations. Specifically, with regard to species deletion based on water body type, EPA does not agree with MDNR's convention of deleting data for cladocerans for all stream subcategories. While cladocerans typically reside in more quiescent waters, flowing waters with adequate pooling and slow flowing runs will support cladoceran species. As these conventions are not fully consistent with EPA guidance and are not independently supported by the State, the specific recalculations following these conventions are not scientifically defensible either.

In addition, MDNR addresses the extent to which ambient water hardness affects metals toxicity by expressing its metals criteria as applicable to three ranges of hardness. Criteria assigned to the hardness range of 125 to 200 mg/L (as $CaCO_3$) are developed using a "middle" hardness value of 150 mg/L. Using this approach, these criteria might allow for toxic conditions where ambient hardness is lower than 150 mg/L. This approach will not ensure that aquatic life is protected under all hardness levels.

In the past MDNR has recalculated aquatic life criteria after deleting a number of aquatic species without providing data which justifies those deletions. The State has also relied on existing levels of certain metals as grounds for criteria based on a determination that toxicity-based criteria cannot be achieved in State surface waters. These approaches do not ensure that State water quality criteria protect the designated aquatic life uses and are not consistent with the CWA or its implementing regulations. Criteria must be scientifically defensible and protect the designated uses. Issues regarding attainability must be left to assessments addressing the designated uses themselves.

The aquatic life criteria listed in Table 3 enclosed with this letter are disapproved as inconsistent with 40 C.F.R. §§ 131.6 (b) and (c) and 131.11(b)(1). The State can remedy this disapproval by recalculating water quality criteria insuring that any departures from the approach outlined by EPA in the Water Quality Standards Handbook (1994), the Interim Guidance on Determination and Use of Water-Effect Ratios for Metal, Appendix B, (1994) and other EPA policy updates are well documented and demonstrated to adequately protect aquatic life. Unless the state takes action within ninety days of receipt of this letter to revise this provision as recommended, EPA will propose replacement federal water quality standards consistent with section 304(a) of the CWA.

Human Health Protection-Fish Consumption

The State has added new water quality criteria or revised existing criteria for the protection of human health through the consumption of fish for six pollutants resulting in either the adoption of criteria which are not as stringent as the guidance criteria published by EPA under authority at section 304(a) of the CWA or the removal of existing criteria. Where the State adopted criteria less stringent than EPA guidance criteria, the State did not provide scientific justification demonstrating that these criteria are protective of human health consistent with requirements at 40 C.F.R. §131.6 (b) and 131.11(a) and (b)(1)(iii) and are, therefore, disapproved. For one pollutant group, trihalomethanes, the State deleted the human health criterion without any justification. These criteria are included in Table 3 of the enclosure to this letter. The State can remedy this disapproval by adopting criteria as stringent as those published by EPA or by providing information indicating that alternate criteria protect human health and are scientifically defensible. Unless the state takes action within 90 days of receipt of this letter to revise these criteria, EPA will propose replacement federal water quality standards consistent with section 304(a) of the CWA.

Drinking Water Supply

EPA is also disapproving 9 State water quality criteria for the protection of the State's Drinking Water Supply use which the State has not shown are protective of human health through exposures to contaminants in water and fish. These criteria are also listed in Table 3 of the enclosure to this letter. For dioxin and 1,2-dichloropropane the State adopted water quality criteria to support the Drinking Water Supply use which were less stringent than both the SDWA MCL or EPA's section 304(a) criterion. For 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, bis chloromethyl ether, pentachlorobenzene and 1,2,4,5-tetrachlorobenzene, the State criterion was less stringent than the EPA section 304(a) criterion and there was no MCL promulgated. Federal regulations that established a new drinking water MCL of 80 ug/l for trihalomethanes were promulgated on December 16, 1998. The old MCL was 100 ug/l. Based on this new standard, which states are required to adopt by December 16, 2000, EPA is disapproving the State's revised numeric criteria of 100 ug/l for trihalomethanes. The MDNR can either revise this criterion or prepare appropriate scientific justification. Unless the state takes action within 90 days of receipt of this letter to revise these criteria, EPA will propose replacement federal water quality standards consistent with section 304(a) of the CWA.

C. Designated Cold-Water Sport Fisheries, Table C

In revising its water quality standards, the State modified its classification of six streams as Cold-Water Sport Fisheries as listed in Table C to 10 CSR 20-7.031. For the North Fork White River (Ozark County), South Indian Creek (Newton and McDonald Counties) and Spring Creek (Douglas and Ozark Counties) these modifications involved reducing the stream miles classified as Cold-Water Sport Fishery within Table C. However, within Table H many of these stream miles remain classified as Cold-Water Fishery (CWF). All but one mile of the original 23 miles of North Fork White River classified as CWF in Table H remains classified as CWF.. All

nine miles of those originally designated as CWF for South Indian Creek remain classified as CWF in Table H. None of the original six miles of Spring Creek designated as CWF remain CWF within Table H even though Table C indicates that three miles remain CWF. Without further explanation from the State, EPA will treat all three reductions in coverage of the CWF use as a removal of a designated beneficial use. For those portions of the streams for which the CWF use was eliminated, this constitutes a use removal.

In addition, the State removed Turnback Creek (Taney County), Indian Creek (Franklin and Washington Counties) and Bull Shoals Lake (Ozark County) from Table C. Using Tables G and H, Bull Shoals Lake continues to be designated as CWF, Indian Creek is not designated as CWF and Turnback Creek (Taney County) is no longer classified. Although there is confusion from the inconsistent treatment of these waters within State water quality standards between Tables C, G and H, without further explanation from the State, EPA considers these actions within Table C to constitute a removal of a designated beneficial use.

Use removals are allowed under the CWA and federal regulations if the use or uses are not existing uses and the State has demonstrated that attaining the use is not feasible based on six conditions (40 C.F.R. §131.10(g)). As removing the CWF use will result in the application of less stringent water quality criteria, 40 C.F.R. §131.10(j)(2) requires that the State complete a use attainability analysis (UAA) which supports the change in designated use consistent with the requirements at 40 C.F.R. §131.6(f). No UAA supporting these use changes was submitted by the State and, therefore, EPA disapproves these revisions. The State can address this disapproval by restoring the use eliminated for each water body or by providing an explanation which eliminates the inconsistencies within the standards and justifies the removal of the use consistent with federal regulations. Unless the state takes action within 90 days of receipt of this letter to revise these modifications, EPA will promulgate the upgrading of those waters so as to be consistent with CWA 101(a) uses.

D. Designated Beneficial Uses, Tables G and H

Section 101(a)(2) of the CWA calls for the designation of aquatic life and recreational uses for all waters of the U.S., where attainable. EPA's regulations require the state to perform and submit to EPA for approval a use attainability analysis whenever the state does not designate waters for aquatic life and recreational uses. Without an approvable use attainability analysis for each water not designated for CWA section 101(a)(2) uses, i.e. aquatic life and whole body contact uses, these new or revised use designations must be disapproved. For more discussion of EPA's implementation of the requirements under section 101(a)(2) of the CWA, refer to Section III(b) of this letter.

Modifications to 10 CSR 20-7.031 Tables G and H resulted in the deletion of designated uses uses for a number of classified lakes and stream segments or the removal of classified waters altogether. Tables 4.1 and 4.2 of the enclosures lists those exclusions. Such omissions must be supported by approvable use attainability analyses, consistent with Section 101(a)(2) of the CWA and federal regulations at 40 C.F.R. §§ 131.6(a) and (f).

Because the revisions to 10 CSR 20-7.031 identified in Tables 4.1 and 4.2 of the enclosures to this letter are not consistent with Sections 101(a) and 303(c) of the CWA and EPA's regulations at 40 C.F.R. §§ 131.6 and 131.10, and there is no documentation justifying the removal of designated uses, they are hereby disapproved. The State may correct these deficiencies by designating these waters consistent with the CWA and federal regulations or providing a use attainability analysis consistent with 40 C.F.R. § 131.10 for each missing use designation or stream segment. If not corrected within 90 days, EPA will propose to promulgate federal replacement provisions consistent with 40 C.F.R. § 131.10.

SECTION III (b): EXISTING PROVISIONS FOR WHICH EPA REGION VII IS REQUESTING THE ADMINISTRATOR MAKE A FINDING OF INCONSISTENCY UNDER THE CLEAN WATER ACT

Under the authority of section 303(c)(4) of the CWA, the Administrator may propose and promulgate federal regulations establishing new or revised water quality standards in any case where she determines that a revised or new standard is necessary to meet the requirements of the CWA. We have identified the following existing provisions of 10 CSR 20-7.031 to be inconsistent with the CWA and intend to ask the Administrator to make a determination under CWA section 303(c)(4)(B) that new or revised water quality standards are necessary:

A. Outstanding National Resource Waters

Provisions at 10 CSR 20-7.031(7) of Missouri's water quality standards would allow discharges of "new releases" from publicly-owned waste treatment facilities and mine dewatering water that would result in the water quality of the Outstanding National Resource Water (ONRW) not being maintained and protected (i.e., a lowering of water quality), and, thus, are inconsistent with both federal regulations at 40 C.F.R. § 131.12(a)(3) and the State's own antidegradation policy at 10 CSR 20-7.031(2)(C). Section 131.12(a)(3) or "Tier 3" of the federal Water Quality Standards applies to ONRWs where the ordinary use classifications and supporting criteria may not be sufficient or appropriate. The federal regulation requires water quality to be maintained and protected in ONRWs. In fact, ONRWs are provided the highest level of protection under the antidegradation policy. "EPA interprets this provision [of the federal regulation] to mean no new or increased discharges to ONRWs and no new or increased discharge to tributaries to ONRWs that would result in lower water quality to ONRWs" (Water Quality Standards Handbook: 2nd Edition, August 1984).

In summary, the EPA concludes that the state's prohibition of ". . . new releases to outstanding national resource waters from any source other than publicly-owned waste treatment facilities and mine de-watering . . .", as cited in 10 CSR 20-7.031(7) of Missouri's water quality standards, does not provide an appropriate level of protection for high quality waters constituting ONRWs and therefore is inconsistent with the federal regulation requirement that the water quality is to be maintained and protected in ONRWs (Tier 3 waters) that a State chooses to classify as such. Furthermore, ". . . it is inappropriate to exempt whole classes of activities from standards and thereby invalidate that broader, intended purpose of adopted State water quality

standards." (Memorandum from Tudor Davies "Interpretation of Federal Antidegradation Regulatory Requirements", February 22, 1994, pp. 4-6). Again, EPA's interpretation of the requirements for ONRWs emphasizes restriction of new or increased discharges to such waters. Although this interpretation of the regulation is not the only means of assuring that the water quality will be maintained and protected in waters that State chooses to classify as ONRWs,, the present structure of the State's water quality standards deviates significantly from this level of protection and provides no commensurate level of protection. Without providing a level of protection equivalent to that provided under 40 C.F.R. § 131.12(a)(3), the state antidegradation policy is not approvable. The state may revise this provision by either eliminating this exemption from the application of the State's antidegradation policy or creating a new tier of protected waters equivalent to 40 C.F.R. § 131.12(a)(3). Unless the State makes the proposed changes within 90 days of receipt of this letter, EPA Region VII will be requesting that the Administrator make a finding that the state's exemption of new releases to outstanding national resource waters from publicly-owned waste treatment facilities and mine de-watering water is contrary to the requirements of the CWA, and that a promulgation action to correct this deficiency be initiated.

B. Whole Body Contact Use

Section 101(a)(2) of the CWA establishes as a national goal "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and . . . recreation in and on the water," wherever attainable. This national goal is commonly referred to as the "fishable/swimmable" goal of the Act. Section 303(c)(2)(A) requires water quality standards to "protect the public health and welfare, enhance the quality of water, and serve the purposes of this Act." EPA's regulations at 40 C.F.R Part 131 interpret and implement these provisions by requiring that water quality standards provide for fishable/swimmable uses unless those uses have been shown to be unattainable, effectively creating a rebuttable presumption of attainability. The mechanism in EPA's regulations used to overcome the default designation of fishable/swimmable (i.e., the rebuttable presumption) is a use attainability analysis.

Under 40 C.F.R. §131.10(j), States are required to conduct a use attainability analysis (UAA) whenever the State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the CWA, or when the State wishes to remove a designated use that is specified in section 101(a)(2) of the Act, or adopts subcategories of uses that require less stringent criteria. Uses are considered by EPA to be attainable, at a minimum, if the uses can be achieved (1) when effluent limitations under section 301(b)(1)(A) and (B) and section 306 are imposed on point source dischargers, and (2) when cost effective and reasonable best management practices are imposed on nonpoint source dischargers (40 C.F.R. §131.10(d)). EPA's regulations at 40 C.F.R. §131.10 list grounds upon which to base a finding that attaining the designated use is not feasible, as long as the designated use is not an existing use.

A UAA is defined in 40 CFR 131.3(g) as a "structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors." In a UAA, the physical, chemical and biological factors affecting the attainment of a use are evaluated through a water body survey and assessment. Guidance on

water body survey and assessment techniques is contained in the Technical Support Manual, Volumes I-III: Water Body Surveys and Assessments for Conducting Use Attainability Analyses. Volume I provides information on water bodies in general, Volume II contains information on estuarine systems and Volume III contains information on lake systems. (Volumes I-II, November 1983; Volume III, November 1984). Additional guidance is provided in the Water Quality Standards Handbook: Second Edition (EPA-823-B-94-005, August 1994). Guidance on economic factors affecting the attainment of a use is contained in the Interim Economic Guidance for Water Quality Standards: Workbook (EPA-823-B-95-002, March 1995).

As discussed above, EPA regulations effectively establish a "rebuttable presumption" that "fishable/swimmable" uses are attainable and therefore should apply to a water body unless it is affirmatively demonstrated that such uses are not attainable. EPA adopted this approach in order to help achieve the national goal articulated by Congress that, "wherever attainable," water quality should provide for the "protection and propagation of fish, shellfish and wildlife" and for "recreation in and on the water." While facilitating achievement of Congress' goals, the "rebuttable presumption" approach preserves States' paramount role in establishing water quality standards in weighing any available evidence regarding the attainable uses of a particular water body. The rebuttable presumption approach does not restrict the discretion that States have to determine that "fishable/swimmable" uses are not, in fact, attainable in a particular case. Rather, if the water quality goals articulated by Congress are not to be met in a particular water body, the regulations simply require that such a determination be based upon a credible, "structured scientific assessment" of use attainability (40 C.F.R. §131.3(g)).

EPA believes that the rebuttable presumption policy reflected in these regulations is an essential foundation for effective implementation of the CWA as a whole. The "use" of a water body is the most fundamental articulation of its role in the aquatic and human environments, and all of the water quality protections established by the CWA follow from the water's designated use. If a use lower than "fishable/swimmable" is designated based on inadequate information or superficial analysis, water quality-based protections that might have enabled the water to achieve the goals articulated by Congress in section 101(a) may not be put in place. As a result, the true potential of the water body may never be realized, and a resource highly valued by Congress may be forever lost.

In terms of trying to meet the "fishable" aspect of the "fishable/swimmable" goal of the CWA, all classified waters listed in Missouri's Water Quality Standards are designated as/for either warm water aquatic life (and Human health-fish consumption), cool water fishery, or cold water fishery; however, in trying to meet the "swimmable" side of the goal, such designation has not been consistently applied to those same waters. Since 1984, EPA has expressed its concern with MDNR's approach to classifying surface waters for whole body contact. As captured in a document entitled, "A Whole Body Contact Recreation Use Attainability Analysis" (1984), MDNR's philosophy since 1967 has been to withhold the designation of surface waters for whole body contact unless "requested by the public." Although focusing on smaller streams, this philosophy apparently extends to all waters, including large rivers. The lower portion of the Mississippi River in Missouri and the entire Missouri River are not designated for whole body

contact. Without the necessary use attainability analysis, the State's failure to meet the requirements of section 101(a)(2) of the CWA and its implementing federal regulations has and continues to be a significant deficiency within Missouri's water quality standards program.

EPA seeks, through its oversight under section 303(c) of the Act, to ensure that any state's decision to forgo protection of a water body's potential to support "fishable/swimmable" uses results from an appropriately "structured" analysis of use attainment. The State may correct this deficiency by (1) either revising its use classifications to protect fishable/swimmable uses for all classified waters of the State, or (2) conduct a more thorough analysis of use attainability sufficient to rebut the "rebuttable presumption" reflected in the regulations. Unless the State makes the proposed changes within 90 days of receipt of this letter, EPA Region VII will be requesting that the Administrator make a finding that Missouri's failure to adequately justify a use designation lower than a "fishable/swimmable" for all classified waters of the State that currently lack a whole body contact use designation is contrary to the requirements of the CWA, and that a promulgation action to correct this deficiency be initiated.

SECTION IV: ITEMS FOR ATTENTION FOR 2000 TRIENNIAL REVIEW

A. Bacteriological Indicators for Contact Recreation

As you may be aware, EPA is initiating a national program to protect public health at our nation's beaches. On January 13, 1997, EPA sent a letter to Missouri expressing concern with public health risks posed by contaminated bathing beaches. In keeping with this national priority, the Region strongly encourages Missouri to move to adopt EPA's 1986 updated bacteriological ambient water quality criteria supporting primary contact recreation uses during the next triennial review period. As such, EPA would like to provide assistance to the State during the transition to the 1986 indicators. Additionally, the EPA Action Plan for Beaches and Recreational Waters ("Beach Plan") was published in March of 1999. As stated in the Action Plan for Beaches and Recreational Waters, EPA/600/R-98/079 March 1999:

> The transition to E. coli and enterococci indicators will be a priority for the triennial reviews of water quality standards that will occur in FY2000-2002. Beginning with FY2000, EPA Headquarters and Regional Offices will develop management agreements with the states and tribes that will include commitments to have states and tribes adopt the Ambient Water Quality Criteria for Bacteria–1986. Where a state does not amend its water quality standards to include the 1986 criteria, EPA will act under Section 303(c) of the Clean Water Act to promulgate the criteria with the goal of assuring that the 1986 criteria apply in all states not later than 2003.

As cited earlier, EPA commends the State for adding secondary contact recreational use to the Definitions. However, we note that no criteria was adopted to protect this use. EPA recommends that the State should consider criteria sufficient to support primary contact recreational use for those waters where secondary contact use is designated. This approach to

establishing secondary contact criteria is consistent with the CWA section 101(a)(2) goal. This matter is pertinent to the overall 1986 criteria issue and will merit further discussion during the next triennial review.

B. Biologically-Refined Use Designations

Missouri should also consider more refined and balanced, biologically-based, aquatic life use descriptions in future revisions that reflect the resident biotic community. More precisely defined uses allow water quality standards to be implemented more effectively on a watershed basis, and provide a stronger scientific basis on which to select the most appropriate criteria. In addition, the State's emphasis on "recreationally important fish species" in defining its General warm-water and Limited warm-water fisheries does not it reflect an ecologically-based approach to water quality protection. As is reflected by the statements incorporated into the State standards regarding both biological integrity and biocriteria, the health of an aquatic community is a function of all of the organisms inhabiting it, both vegetative and animal, vertebrate and invertebrate.

C. Protection of Threatened and Endangered Species

As part of the 1993 proposed revisions to the State water quality standards, MDNR included provisions addressing the protection of threatened and endangered species under the State's antidegradation policy and provided for consultation with the U.S. Fish and Wildlife Service (FWS) on potential impacts on listed species. In its adoption of the proposed revisions, the MCWC failed to adopt these provisions. EPA strongly supported MDNR's proposed revisions as they ensured that the State's water quality standards would not jeopardize these federally protected species. These same provisions were also supported by the Missouri Department of Conservation, the Missouri Chapter of American Fisheries Society, and the Sierra Club. Under the Endangered Species Act, EPA is required to consult with the FWS when approving State water quality standards. The proposed revisions would have been important to any determination by EPA that EPA's approval of Missouri's water quality standards would not adversely affect federally-listed species. Further, these proposed revisions recognized that MDNR is in the best position to address FWS concerns during the revision process, thereby avoiding eventual EPA disapproval based on potential impacts to listed species. We urge MDNR to reconsider these or similar provisions as part of the next triennial review.

D. Water Quality Criteria

(1) There are some water quality criteria for priority and non-priority pollutants for which EPA has guidance criteria, but for which Missouri has not chosen to adopt criteria to protect its designated uses. In other instances, Missouri has adopted a value less stringent than the EPA guidance criteria and has provided no justification for these less stringent criteria as is required at 40 C.F.R. §131.(b). Missouri should review the need for criteria for those pollutants that may cause or contribute to the impairment of water quality during its next revision of water quality standards.

(2) Table 5 of the enclosure contains a list of pollutants, which were revised by the State that denote questionably small differences between EPA based criteria and the State's numerical criteria. Although the State's criteria in Table 5 appear to be slightly different, they are, nonetheless, less stringent than EPA's recommended criteria and therefore may or may not be protective of designated uses. Federal regulations at 40 C.F.R. §131.11 require that states adopt criteria which are based on sound scientific rationale and which are based on CWA section 304(a) guidance, CWA section 304(a) guidance modified to reflect site-specific conditions or other scientifically defensible methods. The State should review these criteria and explain why and how these criteria were selected over EPA's recommended criteria, ascertain their effectiveness at protecting applicable designated uses, and make necessary corrections that are be consistent with EPA guidance criteria under Section 304(a) of the CWA..

E. Revisions to 10 CSR 20-7.031, Tables G and H

EPA highly recommends that when the MDNR considers changes to Chapter 7.0331, Tables G and H as part of the upcoming triennial review, that it provide a complete list of all proposed changes and explanations regarding those changes as part of the public record for revising state water quality standards. Examples of changes or revisions that should be clearly identified include: changes or revisions to latitudinal/longitudinal locational information for water bodies; use designation upgrades or downgrades; changes to water body segment numbering; and name changes for water bodies. In this way, the public can understand what changes have been made and provide comments in support or opposition to those proposed changes. MDNR has attempted to provide this information through its public notices of proposed and final standards revisions, but in many instances this information is incomplete and specific changes have been identified without supporting rationale.

EPA also strongly recommends that MDNR revise Tables G and H to specifically identify streams designated as General warm-water and Limited warm-water fisheries in the same manner as cool-water and cold-water fisheries are currently identified. As the water quality standards contain criteria specific to these aquatic life subcategories, it is important to provide this use category information to the public and the regulated community.

We further encourage MDNR to consider the development of a companion map document to Tables G and H showing lakes, stream segment delineations, water body names, county boundaries and nearby city names. The States of Nebraska and Kansas have developed such documents both within and outside their standards regulations and they have proven to be extremely useful to the public, the regulated community and other state and federal agencies in reviewing and working with the State water quality standards.

Finally, EPA notes that there are a small number of modified stream segments and lakes in Tables G and H which were reduced in length and acreage (see Tables 6.1 and 6.2 of the enclosure). The reduction of lake acreage and shortening of a stream segment may constitute a reduction in the protection (i.e., a partial removal of a designated use) that was accorded those waters initially. EPA acknowledges the possibility that the State may have corrected or refined

the size of those waters and that no protection has been lost. However, without explanation, EPA cannot rest on that assumption. Therefore, EPA recommends that MDNR review Table(s) 6.1 and 6.2 of the enclosures, explain why those modifications were made, and make any necessary corrections that are consistent with the goals of the CWA and federal regulations.

F. Site-Specific Water Quality Criteria

Federal regulations at 40 C.F.R. §§131.6 and 131.11 specify that water quality criteria must be scientifically sound and protect the designated uses of water bodies in order for them to receive approval by EPA as required at 40 C.F.R. §131.5. Site-specific water quality criteria can be developed by states consistent with these fundamental requirements. States must clearly describe the scientific basis upon which each site-specific criterion is based as part of its submission to EPA of such revisions to the existing, applicable water quality criteria. The State must also clearly show that the applicable designated use will be protected by the application of these revised or alternate criteria. And, as with any revision to the State's existing standards, these criteria must be adopted by the State and submitted to EPA for approval.

Current approaches to site-specific criteria development and implementation at 10 CSR 20-7.031(4)(A)3., (B)1., (B)5. and (L)3. do not provide for formal adoption into the State's water quality standards or subsequent submission to and approval by EPA. Again, as the development of site-specific criteria constitutes a revision to standards, these criteria must be adopted by the State and submitted to EPA for approval. As an alternative to formal adoption of each site-specific criterion, the State may develop detailed procedures implementing these provisions and submit them to EPA for approval. Without EPA review and approval of a detailed methodology describing how the State develops site-specific criteria, the State must adopt each individual criterion into its standards. The State should consider revisions to Chapter 7 to address this issue or develop detailed procedures describing the development process as part of its next triennial review.

G. Variances

We are generally aware that the Missouri Clean Water Commission has, in the past, awarded variances to the implementation of the State's water quality standards in the context of issuing NPDES permits. Although Missouri's Clean Water Law at section 204.061 provides for the Commission's granting of variances from compliance with sections of that Law, there is no provision within 10 CSR 20-7.031 which provides for the use of variances from water quality standards. Federal regulations at 40 C.F.R. §§131.13 provide for discretionary state adoption of general policies, such as variances, into state standards. However, these policies are subject to EPA review and approval. With the currently planned revisions to 40 C.F.R. §131.21(c), such policies would not become effective for purposes of the CWA until EPA approves them. The authorities described in State statute regarding the use of variances applicable to State water quality standards must be codified in the State's water quality standards regulations, must ensure that designated uses are protected and are subject to EPA review and approval. Without the inclusion of a variance provision within the State standards regulations, implementation of

variances through NPDES permits or TMDLs, for example, would not be consistent with State water quality standards and could lead to disapproval of State-developed TMDLs or non-concurrence with State-developed NPDES permits relying on such variances or could result in a challenge to a permit. We urge the State to adopt variance provisions into 10 CSR 20-7.031 consistent with the authorities described in the Missouri Clean Water Law and federal regulation and guidance.

H. Whole Effluent Toxicity Testing

References to whole effluent toxicity testing and the interpretation of testing results at 10 CSR 20-7.031(1)(A), (1)(E), (1)(Y), (3)(I) and (4)(P) should more definitively describe aspects of these methods, such as test species selection, and should directly reference test methods required by federal regulations at 40 C.F.R. §136.

I. Antidegradation Implementation Procedures

We recognize that MDNR has attempted over the past ten years to develop methods for implementing its antidegradation policy. However, MDNR has yet to propose procedures to the Missouri Clean Water Commission (MCWC). The Federal regulation at 40 C.F.R. § 131.12(a) requires each state to ". . .develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart." While the EPA had previously approved Missouri's antidegradation policy in 1991, and is approving the 1994 revisions to that policy in this letter, the State has not submitted implementation methods. Therefore, the State is not in full compliance with 40 C.F.R. § 131.12(a). The State can remedy this omission by providing EPA with proposed procedures that will address the implementation of the State's Antidegradation Policy. The State should address the means by which it intends to implement its antidegradation policy to protect existing instream uses, waters where the quality exceed levels necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, and high quality waters constituting Outstanding National Resource Waters (ONRW) and Outstanding State Resource Waters (OSRW). Implementation procedures should accomplish two basic tasks: (1) specify how you will identify and define the existing use in a particular water body, and (2) specify the requirements you have in place to maintain and protect an existing use and the water quality needed to protect that existing use. In general, implementation procedures specify the process by which you will meet the requirements of your antidegradation policy, resulting in acceptance, modification, or prohibition of a proposed activity. Implementation procedures apply to state regulation of point and non-point sources of pollution. Therefore, antidegradation procedures should explain how, and to what extent, the State will require implementation of otherwise non-enforceable (voluntary) best management practices (BMP) for non-point source before allowing point source degradation of high quality waters.

J. Protection of Unclassified Waters

Nationally, EPA will be examining the issue of whether or not the states have an appropriate default use in their general criteria for unclassified/unlisted waters, and if so, if that

default use is protective of the existing use or is consistent with the "fishable/swimmable" goal of the CWA. As discussed in Item B under Section III(b) of this letter (Re: Whole Body Contact Use), Section 101(a)(2) of the CWA establishes the national goal as "water quality which provides for the protection and propogation of fish, shellfish, and wildlife. . .and recreation in and on the water wherever attainable (i.e., fishable/swimmable). Furthermore, EPA's regulation at 40 C.F.R. Part 131 interprets and implements these provisions by requiring that water quality standards provide for a default use designation of "fishable/swimmable" unless those uses have been shown through a use attainability analysis to be unattainable. In conclusion, any water is presumed to have a default use designation of "fishable/swimmable" under the rebuttable assumption, and it is the Agency's view that the States must protect unclassified or unlisted waters as well as classified waters for that default use. We note that although unlisted (i.e., unclassified) waters are protected by the general criteria in the Water Quality Standard, there is no clear default use-designation language in Missouri's WQS's for "unclassified waters". This is an issue which EPA will want to discuss during the triennial review.

K. Mixing Zones for Class C Streams and Streams with 7Q10 Low Flows of 0.1 cfs or Less

EPA believes that allowing mixing zones of any size in intermittent or ephemeral streams, or streams with a 7Q10 of 0.1 cfs or less, might not protect the aquatic life communities under all hydrological circumstances. With minimal dilution available in these small streams, the mixing of wastewater with stream water would be inadequate. In such instances, there is no mixing zone. Therefore, chronic aquatic life criteria should be met, with the amount of stream dilution made available through State standards, at the point of entry into the stream. This concept is already recognized within the State's mixing zone regulations for these streams by prohibiting the application of zones of initial dilution. The State should consider future revisions to its mixing zone regulations for these streams such that mixing zones would be prohibited.

L. High Flow Exemption

EPA acknowledges that extremely high flow events might contribute to exceedences of the fecal coliform bacteria criterion for whole body contact. We are aware that several states have attempted to address concerns regarding the application of standards during extremely high flow events. The exemption from the application of Missouri's fecal coliform bacteria criteria at 10 CSR 20-7.031(4)(C) for periods when a stream or lake is affected by stormwater runoff might not ensure that the whole body contact use is adequately protected. Federal regulations at 40 C.F.R. §§131.5(a)(2) and 131.11(a) require that states adopt criteria that protect designated beneficial uses. Of further concern to EPA, Missouri's high flow exemption is broad and qualitative, providing for possibly inappropriate and arbitrary implementation. EPA has already disapproved a more detailed and quantitative high flow exemption in Kansas. We very strongly urge MDNR to review, revise or eliminate this provision as part of your triennial review process. The State should consider other alternatives to addressing high flow issues such as the application of variances or performance of use attainability analyses supporting use changes.

SECTION V: ENDANGERED SPECIES ACT CONSULTATION

EPA initiated discussions with the United States Fish and Wildlife Service in May 2000, as required by the Endangered Species Act, to determine whether this approval action is not likely to jeopardize the existence of federally listed species or result in the adverse modification of designated critical habitat of such species. The Service has expressed concern only about the State's chronic aquatic life use criterion for selenium. Through a national consultation, the Service and EPA have agreed on measures to update selenium criteria, and we anticipate that EPA will be revising its recommended acute and chronic aquatic life use criteria for selenium by January 2002. For now, however, the State's chronic aquatic life use criterion for selenium is approved because it is consistent with EPA's current CWA 304(a) criterion.

Any necessary, subsequent promulgation of federal water quality standards for Missouri by EPA under authority of Section 303(c)(4)(A) and (B) of the CWA will be conducted in accordance with Section 7 of the ESA.

There is much more work to be done by both of our agencies regarding the development of water quality standards which will fully protect the citizens and resources of the state of Missouri. The approved state standards, however, represent significant progress in that continuing effort and I congratulate your staff in its efforts to date. I look forward to working with you to bring the state into full compliance with the CWA, rendering the need for EPA's promulgation of federal water quality standards for Missouri unnecessary.

If you have any questions regarding these comments or the actions taken by EPA, please contact Cheryl A. Crisler, Water Resource Protection Branch Chief, at (913) 551-7820.

Sincerely,

Pradip C. Dalal

for U. Gale Hutton, Director
Water, Wetlands, and Pesticides Division

Enclosures

cc:

John Young	MDNR
Edwin Knight	MDNR
John Madras	MDNR
Mark Wilson	U.S. Fish and Wildlife Service, Columbia, Missouri

TABLE 1

MISSOURI SURFACE WATER QUALITY CRITERIA
APPROVAL SUMMARY

Missouri uses a 1 x 10^{-6} Human Health Risk Factor

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
1.A PRIORITY POLLUTANTS									
Antimony 7440360					6	6	14		
Beryllium 7440417					4	4	No Criteria		
Cadmium 7440439 (H = 150 mg/L)	6.6	Use Specific (see 1.D)	3.0	Use Specific (see 1.D)	5	5	No Criteria		
Copper 7440508 (H = 150 mg/L)					1300	1,300	1,300		
Lead 7439921 (H = 150 mg/L)					15	15	No Criteria		
Nickel 7440020 (H = 150 mg/L)					100	100	610		
Zinc 7440666	165	Use Specific (see 1.D)	167	Use Specific (see 1.D)					

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Chromium VI 18540299	16	Use Specific (see 1.D)	11	Use Specific (see 1.D)					
Selenium 7782492			5.0	5.0	50	50	170		
Silver 7440224 (H = 150 mg/L)			No Criteria	N					
Thallium 7440280								6.3	6.3
Asbestos 1332214					7 million fibers/L	7 million fibers/L	7 million fibers/L		
Chlorobenzene 108907					No STD	100	680	21,000	21,000
Dichlorobromomethane 75274								46	46
1,2-Dichloropropane 78875								39	39

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Ethylbenzene 100414					700	700	3,100		
Methyl Chloride 74873					No STD	5	No Criteria		
Toluene 108883					1,000	1,000	6,800	200,000	200,000
1,2-Trans-Dichloroethylene 156605					100	100	700		
1,2-Cis-Dichloroethylene					70	70	No Criteria		
1,1,2-Trichloroethane 79005					5	5	0.60	42	42
2-Chlorophenol 95578								400	400
2,4-Dichlorophenol 120832					No STD	93	93	790	790
2,4-Dimethylphenol 105679					No STD	540	540	2,300	2,300
Pentachlorophenol 87865					1	1	0.28	8.2	8
Phenol 108952					No STD	100	21,000		

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2,4,6-Trichlorophenol 88062					No STD	2	2.1		
Acenaphthene 83329					No STD	1,200	1,200		
Anthracene 120127					No STD	9,600	9,600	110,000	110,000
Benzo-a-Anthracene 56553 (PAH)					No STD	0.0044	0.0044	0.049	0.049
Benzo-a-Pyrene 50328 (PAH)					0.2	0.2	0.0044	0.049	0.049
Benzo-k-Fluoranthene 207089 (PAH)					No STD	0.0044	0.0044	0.049	0.049
Bis2-Chloroisopropyl Ether 39638329					No STD	1,400 300(HA)	1,400		
Di (2-ethylhexyl) phthhalate 117817					6	6	1.8	5.9	5.9[1]

[1] Existing criterion

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Di (2-ethylhexyl) adipate					400	400	No Criteria		
Chrysene 218019 (PAH)					No STD	0.0044	0.0044	0.049	0.049
Dibenzo-a-h-Anthracene 53703 (PAH)					No STD	0.0044	0.0044	0.049	0.049
1,3-Dichlorobenzene 541731					600	600	400	2600	2600[2]
1,2-Dichlorobenzene 95501 (Other dichlorobenzenes)					600	600	2,700		
3-3'-Dichlorobenzidine 91941					No STD	0.04	0.04		
Fluoranthene 206440					No STD	300	300	370	370
Fluorene 86737					No STD	1,300	1,300	14,000	14,000
Hexachlorobenzene 118741					1	1	0.00075		

[2] Existing criterion

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Hexachlorocyclopentadiene 77474					50	50	240		
Ideno 1,2,3-cd-Pyrene 193395 (PAH)					No STD	0.0044	0.0044	0.049	0.049
Isophorone 78591					No STD	36	36	2,600	2,600
N-Nitrosodi-n-Propylamine 621647								1.4	1.4
Pyrene 129000					No STD	960	960	11,000	11,000
1,2,4-Trichlorobenzene 120821					70	70	260	940	940
Aldrin 309002					No STD	0.00013	0.00013		
gamma-BHC (Lindane)58899					0.2	0.2	0.019		
Chlordane 57749					2	2	0.0021		
Dieldrin 60571					No STD	0.00014	0.00014		
Endrin 72208					2	2	0.76		

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Heptachlor 76448					0.4	0.4	0.00021		
Heptachlor Epoxide 1024573					0.2	0.2	0.00010		
Toxaphene 8001352					3	3	0.00073		

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1.B NON-PRIORITY POLLUTANTS									
Alachlor					2	2	N		
Aluminum pH 6.5-9.0 7429905	750	750							
Atrazine					3	3			
Barium 7440393					2,000	2,000	1,000		
Carbofuran					40	40	N		
Chloride 16887006	860,000	860,000	230,000	230,000					
Chlorine 7782505	19	19ww	11	10ww 2cw					
Chlorophenoxy Herbicide 2,4,5-TP 93721					50	50	10		
Chlorophenoxy Herbicide 2,4-D 94757					70	70	100		
Dalapon					200	200	N		

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Dibromochloropropane					0.2	0.2	N		
Dinoseb					7	7	N		
Diquat					20	20	N		
Endothall					100	100	N		
Ethylene dibromide					0.05	0.05	N		
Fluoride					4,000	4,000	N		
Glyphosate					700	700	N		
Methoxychlor 72435					40	40	100		
Oil and Grease			No Criteria	10,000					
Oxamyl (vydate)					200	200	N		
Picloram					500	500	N		
Simazine					4	4	N		

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Styrene					100	100	N		
Sulfate and Chloride			No Criteria	120% of Natural Bkgnd.					
Sulfide-Hydrogen Sulfide 7783064			2.0	2.0					
Tetrachlorobenzene, 1,2,4,5- 95943								2.9	2.9
Trichlorophenol, 2,4,5- 95954					No STD	2,600	2,600	9,800	9,800
Xylenes (total)					10,000	10,000	N		

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Styrene					100	100	N		
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Xylenes (total)					10,000	10,000	N		

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1.C HEALTH ADVISORIES									
Ametryn						60			
Baygon						3			
Bentazon						20			
Bis-2-chloroisopropyl ether						300			
Bromacil						90			
Bromomethane						10			
Butylate						350			
Carbaryl						700			

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APPROVAL SUMMARY

Missouri uses a 1 x 10^{-6} Human Health Risk Factor

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
Carboxin						700			
Chloramben						100			
o-chlorotoluene						100			
p-chlorotoluene						100			
Chlorpyrifos						20			
DCPA(dacthal)[3]						4000			
Diazinon						0.6			
Dicamba						200			
Diisopropyl methylphosphonate						600			
Dimethyl methylphosphonate						100			

[3] No HA available, less than longer term values for child or adult

TABLE 1

MISSOURI SURFACE WATER QUALITY CRITERIA
APPROVAL SUMMARY

Missouri uses a 1 x 10^{-6} Human Health Risk Factor

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
1,3-dinitrobenzene						1			
Diphenamid						200			
Diphenylamine						200			
Disulfoton						0.3			
1,4-dithiane						80			
Diuron						10			
Fenamiphos						2			
Fluometron						90			
Fluorotrichloromethane						2000			
Fonofos						10			
Hexazinone						200			
Malathion						200			
Maleic hydrazide						4000			

TABLE 1

MISSOURI SURFACE WATER QUALITY CRITERIA
APPROVAL SUMMARY

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MCPA						10			
Methyl parathion						2			
Metolachlor						70			
Metribuzin						100			
Napththalene						20			
Nitroguanidine						700			
p-nitrophenol						60			
Paraquat						30			
Pronamide						50			
Propachlor						90			
Propazine						10			
Propham						100			
2,4,5-T						70			
Tebuthiuron						500			

TABLE 1

MISSOURI SURFACE WATER QUALITY CRITERIA
APPROVAL SUMMARY

Missouri uses a 1 x 10^{-6} Human Health Risk Factor

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
Terbacil						90			
Terbufos						0.9			
1,1,1,2-Tetrachlorothane						70			
1,2,3-trichloropropane						40			
Trifluralin						5			
Trinitroglycerol						5			
Trinitrotoluene						2			

[1] - no HA available, less than longer term values for child or adult

TABLE 1

MISSOURI SURFACE WATER QUALITY CRITERIA
APPROVAL SUMMARY

Missouri uses a 1×10^{-6} Human Health Risk Factor

1.D Missouri Aquatic Life Use Criteria for site specific application for Selected Metals (µg/L)
(Hardness = 150 mg/L as $CaCO_3$)

Pollutant	Lakes		CWF		GWWF		LWWF	
	Acute	**Chronic**	**Acute**	**Chronic**	**Acute**	**Chronic**	**Acute**	**Chronic**
Cadmium			5.9	1.4				
Chromium *	16	11						
Zinc	161	147						

* - chromium criteria based on the toxicity of hexavalent chromium which is not based on hardness

TABLE 2.1 - Lakes
Approved

WATERBODY	CLASS	COUNTY	LOCATION	ACRES	New	Modified	Expln	Approved
Agate Lake	L1	Lewis	13,60N,6W	167	X			X
Aggrevation Lake	L3	Franklin	31,42N,02E	40	X			X
Amarugia Highlands Lake	L3	Cass	10/11,43N,32W	55	X			X
Anthonies Mill Lake	L3	Washington	19,39N,01W	110	X			X
Antimi Lake	L3	Boone	NE,NE,3,48N,12W	3	X			X
Apollo Lake	L3	St. Francois	21,36N,05E	22	X			X
Archie Lake	L1	Cass	SE,SE,28,43N,31W	3.5	X			X
Arrow Rock Lake	L3	Saline	36,50N,19W	5	X			X
Baja Lake Assoc. Lake	L3	Washington	05,39N,01E	30	X			X
Belcher Branch Lake	L3	Buchanan	08/17,55N,34W	55	X			X
Belle City Lake	L3	Maries	20,41N,7W	3	X			X
Bethany Lake #2	L1	Harrison	27,64N,28W	50	X			X
Big Buffalo Wildlife Area L	L3	Benton	12,41N,20W	5	X			X
Bilby Ranch Lake	L3	Nodaway	13/24,64N,38W	110	X			X
Blue Lake	L3	Phelps	09,37N,08W	10	X			X
Blue Mountain Camp	L1	Madison	NW SE,9,33N,5E	14	X			X
Blue Springs Lake	L3	Jackson	03/04,48N,31W	720	X			X
Bluestem Lake	L3	Jackson	22,47N,31W	15	X			X
Bodarc Lake	L3	Jackson	23,47N,31W	15	X			X
Bowling Green Lake (Old)	L1	Pike	NE NE 30,53N,2W	7		X	+DWS;L3 to L1	X
Cameron #4 (Grindstone Re.)	L1	Dekalb	05/08,57N,30W	180	X			X
Cameron Lake #3	L1	Dekalb	SE NE 9,57N,30W	96	X			X
Camp Irondale Lake	L3	Washington	13,36N,01E	10	X			X
Camp Solidarity Lake	L3	Franklin	24,43N,02E	12	X			X
Catclaw Lake	L3	Jackson	14,47N,31W	42	X			X
Clever Dell Lake	L3	Pettis	13,45N,22W	12	X			X
Cole County Park Lake	L3	Cole	17,44N,12W	7	X			X
Conner O. Fewell Lake	L3	Henry	32/29,43N,25W	10	X			X
Cool Valley Lake	L3	Franklin	09,40N,02E	35	X			X
Coot Lake	L3	Jackson	22,47N,31W	22	X			X
Cosmo-Bethel Lake	L3	Boone	NW,36,48N,13W	6	x			X
Cottontail Lake	L3	Jackson	14,47N,31W	27	X			X
Creighton Lake	L1	Cass	NW SE,14,43N,29W	14	x			X
Crescent Lake	L3	Franklin	02,42N,01W	10	X			X
Crooked Creek Lake	L3	Crawford	7,36N,4W	3	x			X
Drexel Lake #2	L1	Bates	SW NE 6,42N,33W	51		X	+DWS	X
E A Pape Lake (Concordia)	L1	Lafayette	20,48N,24W	245		X	a.k.a. Concordia L	X

TABLE 2.1 - Lakes
Approved

WATERBODY	CLASS	COUNTY	LOCATION	ACRES	New	Modified	Expln	Approved
Fawn Lake	L3	Franklin	13,43N,02W	50	X			X
Foxboro Lake	L3	Franklin	14,42N,04W	25	X			X
Garden City New Lake	L1	Cass	NW,18,43N,29W	46	x			X
Gerald City Lake	L3	Franklin	12,42N,4W	5	x			X
Gopher Lake	L3	Jackson	23,47N,31W	42	X			X
Harmony Mission Lake	L3	Bates	15,38N,32W	96	X			X
Harrison County Lake	L1	Harrison	17/30,65N,28W	280	X			X
Harrisonville Lake	L1	Cass	SW SW 26,46N,31W	385		X	Coord. change	X
Hazel Hill Lake	L3	Johnson	28,47N,26W	71	X			X
Hermit Hollow Lake	L3	Franklin	29,44N,02E	10	X			X
HiPoint Lake	L3	Washington	24,39N,1E	3	x			X
Holden Lake (New)	L1	Johnson	29,46N,28W	380		X	+110acres	X
Hough Park Lake	L3	Cole	19,44N,11W	7	X			X
Indian Creek Lake	L3	Livingston	15/27,59N,25W	192	X			X
Izaak Walton Lake	L3	Vernon	32,36N,31W	7	X			X
Jackrabbit Lake	L3	Jackson	15,47N,31W	31	X			X
Jamesport Community Lake	L1	Daviess	NE20,60N,26W	30		X	L3 to L1	X
Jasper Lake	L3	Lewis	13,60N,6W	35	x			X
Junge's Lake	L3	Benton	10,41N,21W	40	x			X
Kahrs Boger Lake	L3	Pettis	15,44N,20W	5	X			X
King City Lake (South)	L1	Gentry	SW,SW,34,61N,32W	32	X			X
King Lake	L3	Dekalb	12-13,60N,31W	231		X	+DWS	X
Knob Noster St. Park Lakes	L3	Johnson	29/30,46N,24W	24		X	+4acres	X
Lake of the Woods	L3	Boone	NE,2,48N,12W	3	X			X
Lamine C.A. Lakes	L3	Cooper	2-11-22-27,46N,19W	17	X			X
Lawson City Lake	L1	Ray	3154N,29W	25		X	+DWS	X
Liberty Park Lake	L3	Pettis	05,45N,21W	2	X			X
Lions Lake	L3	Franklin	16,44N,01W	10	X			X
Lions Lake	L3	Johnson	26,46N,26W	5	X			X
Little Compton Lake	L3	Carroll	29/32,55N,21W	40	X			X
Lone Jack Lake	L3	Jackson	14,47N,30W	35		X	coord. change	X
Mac Lake (Ziske)	L3	Dent	17,34N,07W	30		X	a.k.a. Ziske	X
Maple Leaf Lake	L3	Lafayette	04,48N,26W	140	X			X
Marshall Habilitation Center L	L3	Saline	11,50N,21W	12	X			X
Maysville Lake #3	L1	Dekalb	NE,4,58N,12W	53	X			X
McKay Park Lake	L3	Cole	13,44N,12W	6	X			X
Memphis Lake #1	L1	Scotland	NE NE 14,65N,12W	39		X	+DWS	X

TABLE 2.1 - Lakes
Approved

WATERBODY	CLASS	COUNTY	LOCATION	ACRES	New	Modified	Explin	Approved
Middle Fork Water Comp.	L1	Gentry	NW SW 6,64N,31W	170	X			X
Milan Lake - Elmwood	L1	Sullivan	NE NE 35,62N,20W	235	X			X
Milan Lake (New)	L1	Sullivan	SE,SE,2,62N,20W	15	X			X
Milan Lake Elmwood	L1	Sullivan	NE NE35,63N,20W	235		X	was Milan L.(New)	X
Mineral Lake	L3	Franklin	01,42N,03W	20	X			X
Montrose Lake	L3	Henry	NE NW 33,41N,27W	1568		X	+acres from 1421	X
Mozingo Lake	L1	Nodaway	19,65N,34W	1000	X			X
Nell Lake	L3	Jackson	15,47N,31W	31	X			X
Niangua Lake	L3	Camden	35,37N,18W	360		X	+210acres	X
Noblett Lake	L3	Douglas	25,26N,11W	26		X	+5acres	X
Painted Rock Lake	L3	Osage	11,42N,11W	4	X			X
Peabody Wildlife Area Lake	L3	Bates	4/9,38N,32W	36	X			X
Penn's Pond Lake	L3	Pulaski	06,34N,11W	12	X			X
Perry C.A. Lakes	L3	Johnson	2,47N,24W	4	X			X
Pike Lake	L3	Livingston	2,59N,25W	20	X			X
Pinewoods Lake	L3	Carter	07,26N,03E	30	X			X
Plover Lake	L3	Jackson	15,47N,31W	15	X			X
Poague Wildlife Area Lake	L3	Henry	19,42N,26W	77	X			X
Port Hudson Lake	L3	Franklin	16,43N,03W	55	X			X
Prairie Home C.A. Lakes	L3	Cooper/Moniteau	25,46N,15W	25	X			X
Prairie Lee Lake	L3	Jackson	NE NW27,48N,31W	150		X	+16acres	X
Primrose Lake	L3	St. Francois	23,38,04E	100	X			X
Proctor Park Lake	L3	Moniteau	34,45N,15W	6	X			X
Radio Springs Lake	L3	Vernon	08,35N,31W	8	X			X
Salisbury (Pine Ridge Lake)	L3	Chariton	15,53N,17W	25		X	a.k.a. Pine Ridge L	X
Scioto Lake	L3	Phelps	29,38N,6W	3	X			X
Seqiuota Park Lake	L3	Greene	09,28N,21W	3	X			X
Settles Ford C.A. Lakes	L3	Bates	9-10,42N,29W	110	X			X
Seven Springs Lake	L3	Phelps	23-24,36N,06W	35		X	coordinate change	X
Shawnee Lake (Turner)	L3	Dent	17,34N,07W	17		X	a.k.a. Turner	X
Snow Hollow Lake	L3	Iron	26/27,34N,03E	38	X			X
St. Louis, Lake	L3	St. Charles	NE SW 26,47N,2E	525		X	+WBC	X
Ste. Louise, Lake	L3	St. Charles	SW SW 27,47N,2E	87		X	+WBC	X
Stockton Lake	L2	Cedar	NE NE15,34N,26W	23,680		X	+DWS	X
Stokes Lake #1(Arrowhead)	L3	Howell	18,23N,08W	60	X			X
Stokes Lake #2(Arrowhead)	L3	Howell	18,23N,08W	80	X			X
Sullivan City Lakes	L3	Crawford	17,40N,2W	5	X			X

TABLE 2.1 - Lakes
Approved

WATERBODY	CLASS	COUNTY	LOCATION	ACRES	New	Modified	Expln	Approved
Swiss Lake Development Lake	L3	Gasconade	21-28,44N,05W	40	X			X
Tasney Lake	L3	Jackson	SE SE22,48N,30W	17		X	+1acre	X
Tea Lake	L3	Gasconade	08,41N,04W	25	X			X
Tobacco Hills Lake	L3	Platte	NW,11,53N,35W	17	X			X
Torino Lake	L3	Franklin	20,42N,02E	10	X			X
Twin Lake	L3	Boone	SW,SW,22,48N,13W	18	X			X
Union City Lake	L3	Frankllin	27,43N,1W	5	X			X
Unionville Lake (Thunderhead,	L1	Putnam	NE NE15,66N,19W	1015		X	a.k.a. Thunderhead	X
Van Meter St. Park Lake	L3	Saline	24,52N,22W	8		X	+3acres	X
Viking, Lake	L1	Daviess	9,59N,28W	550		X	+DWS	X
Wahoo Lake	L3	St. Francois	14,38N,04E	25	X			X
Wallace SP Lake	L3	Clinton	NE,24,56N,30W	6	X			X
Wellsville Quarry	L1	Montgomery	NE,SE,4,50N,6W	1.3	X			X
White Area L. (Whiteside)	L3	Lincoln	SW SUR.1686,51N,1W	28		X	a.k.a. Whiteside L	X
Willow Lake	L3	Vernon	27-34,34N,32W	29	X			X
Windsor City Lake	L3	Pettis	06,43N,23W	20	X			X

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Atwell Cr.-Trib. to Unnmd trib.	1	Mouth	07,38N,11W	Maries		x			x
AB Creek	3	Mouth	32,37,18W	Dallas	Camden	x			x
Allen Br.	2	Mouth	22,37N,1E	Washington		x			x
Anderson Cr.	2	Mouth	31,33N,09W	Texas		x			x
Asher Hollow Cr.	4	Mouth	24,37N,06W	Crawford	Phelps	x			x
Bannister Hollow	4	Mouth	36,38N,19W	Camden		x			x
Barkers Cr.	13	Mouth	09,43N,23W	Henry	Benton		x	+ 5 mi	x
Basin Fk.	13	Mouth	17,44N,23W	Pettis			x	+ 5.7 mi	x
Bauer Br.	3	Mouth	29,42N,21W	Benton		x			x
Bear Claw Spring	0	Mouth	33,30N,08W	Texas		x			x
Bear Cr.	1	Mouth	34,43N,04E	Jefferson		x			x
Bear Cr.	10	Mouth	15,54N,36W	Platte			x	+ 2.8 mi	x
Beaver Dam Cr.	5	Mouth	Hwy 54	Audrain		x			x
Beaver Dam Cr.	5	Mouth	02,46N,23W	Pettis		x			x
Bee Br.	4	Mouth	06,47N,23W	Pettis		x			x
Bee Br.	6	Mouth	20,37N,30W	Vernon		x			x
Bee Branch	0	Mouth	32,46N,23W	Pettis	Johnson	x			x
Bee Cr.	2	Mouth	17,23N,21W	Taney			x	+0.6mi	x
Bee Rock Hollow	1	Mouth	03,31N,07W	Texas		x			x
Bee Run	2	Mouth	24,38N,04E	St. Francois		x			x
Beecham Br.	1	Mouth	01,36N,29W	Vernon		x			x
Belew Cr.	7	Mouth	28,41N,04E	Jefferson			x	+1.6 mi	x
Big Br.	1	Mouth	22,43N,04W	Franklin		x			x
Big Br.	3	Mouth	23,44N,04W	Franklin		x			x
Big Buffalo Cr.	4	12,41N,20W	28,41N,19W	Morgan			x	+1.6mi, +CLF	x
Big Cr.	4	Hwy 150	20,47N,31W	Jackson		x			x
Big Cr.	61	Mouth	Hwy 150	Henry	Jackson		x	+12.3 mi	x
Big Hollow	3	Mouth	23,22N,21W	Taney		x			x
Big River Cr.	1	Mouth	09,40N,05W	Gasconade		x			x
Billy's Br.	2	Mouth	06,37N,01W	Crawford	Washington	x			x
Billy's Br.	2	06,37N,01W	05,37N,01W	Washington		x			x
Black Cr.	8	Mouth	35,43N,32W	Cass		x			x
Block Br.	0	Mouth	18,41N,04W	Gasconade		x			x
Block Br.	2	18,41N,04W	12,41N,05W	Gasconade		x			x
Boiling Spring	0	Mouth	24,32N,10W	Texas		x			x
Bourne Cr.	2	Mouth	04,42N,04E	Jefferson		x			x
Brawley Cr.	3	Mouth	26,45N,26W	Johnson		x			x

TABLE 2.2 - Streams Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Brickley Hollow	1	Mouth	35,41N,21W	Benton		x			x
Brush Cr.	2	Mouth	17,43N,10W	Osage		x			x
Brush Cr.	5	Mouth	36,50N,27W	Lafayette			x	+2.4mi	x
Brush Cr.	13	Mouth	16,35N,24W	St. Clair	Polk		x	+1.7 mi	x
Brushy Cr.	2	Mouth	27,46N,23W	Pettis		x		('94)	x
Brushy Cr.	4	Hwy 63	14,30N,09W	Texas			x	+1.5 mi	x
Brushy Cr.	1	5W32,46N,21W	SE6,46N,21W	Pettis		x		('95)	x
Brushy Cr.	3	Mouth	SW32,46N,21W	Pettis		x		Was Fk.; +2mi; C to P ('96)	x
Brushy Fk.	4	Mouth	21,49N,2E	Lincoln			x	end-coord.change	x
Buchler Cr.	1	Mouth	14,42N,09W	Osage		x			x
Buffalo Cr.	2	Mouth	28,48N,22W	Saline	Pettis	x			x
Buncomb Br.	1	Mouth	26,48N,23W	Pettis		x			x
Burkhart Br.	4	Mouth	12,31N,12W	Texas		x			x
Burr Oak Cr.	7	Mouth	19,49N,31W	Jackson		x			x
Butcher Br.	2	Mouth	12,40N,04E	Jefferson		x			x
Camp Br.	4	Smithvle Lk	36,54N,32W	Clay		x			x
Camp Br.	8	Mouth	24,45N,23W	Pettis		x			x
Camp Br.	4	Mouth	35,29N,10W	Texas		x			x
Camp Cr.	1	29,36N,06E	Hwy EE	St. Francois		x			x
Carroll Cr.	9	Mouth	04,53N,30W	Clay			x	+4.4 mi	x
Cat Hollow	2	Mouth	33,35N,18W	Dallas		x			x
Cathcart Hollow	2	Mouth	20,31N,09W	Texas		x			x
Cave Cr.	3	Mouth	14,34N,18W	Dallas		x			x
Cedar Cr.	5	Mouth	12,47N,32W	Jackson		x			x
Cedar Cr.	3	Mouth	26,46N,21W	Pettis			x	+0.5 mi	x
Cedar Cr.	5	Mouth	34,40N,08W	Maries		x			x
Cheese Cr.	6	Mouth	09,43N,21W	Pettis	Benton	x			x
Cherry Valley Cr.	1	Mouth	Hwy.BB	Crawford		x		Proposed Rule indicates as a Trib.	x
Clear Cr.	14	Hwy 92	09,54N,31W	Clinton			x	+1.5mi; change end-coord	x
Clear Fk.	25	Mouth	35,45N,25W	Johnson			x	+11.5mi	x
Clear Fk.	9	35,45N,25W	18,44N,24W	Johnson			x	-6.4mi	x
Clear Spring	0	Mouth	19,28N,08W	Texas		x			x
Clifty Hollow Cr.	3	Mouth	11,38N,10W	Maries		x			x
Cole Camp Cr.	16	Mouth	08,42N,21W	Benton			x	+7.4 mi	x
Coon Cr.	5	Mouth	16,45N,22W	Pettis		x			x
Coon Cr.	5	Mouth	24,22N,21W	Taney			x	+2.9 mi	x
Coon Hollow	3	Mouth	14,28N,07W	Texas		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Cooney Cr.	1	Mouth	11,40N,20W	Benton		x			x
Cooper Cr.	2	07,22N,21W	06,22N,21W	Taney		x			x
Cooper Cr.	0	Mouth	07,22N,21W	Taney		x			x
Corn Cr.	1	Mouth	36,36N,09W	Phelps		x			x
Cottonwood Cr.	2	Mouth	28,36N,33W	Vernon		x			x
Cox Br.	2	Mouth	Hwy V	Phelps		x			x
Crane Cr.	3	04,36N,21W	12,36N,21W	Hickory			x	-1.6mi	x
Crane Cr.	7	Mouth	04,36N,21W	Hickory			x	+4.4mi	x
Crooked Cr.	5	Mouth	06,44N,23W	Johnson	Pettis	x			x
Davis Cr.	11	8,48N,27W	07,48N,26W	Lafayette			x	+5.4mi; coord. change	x
Decker Br.	2	Mouth	35,36N,22W	Hickory		x			x
Deer Cr.	12	Mouth	21,39N,20W	Benton			x	+0.7mi	x
Deer Cr.	2	21,39N,20W	03,38N,20W	Benton	Hickory		x	+0.3	x
Dew Pond Hollow	3	Mouth	15,30N,07W	Texas		x			x
Dirt House Hollow	2	Mouth	28,29N,07W	Texas		x			x
Ditch Cr	2	Mouth	12,40N,03E	Jefferson	Washington		x	+0.8mi; C to P	x
Ditter Cr.	1	Mouth	03,41N,23W	Benton		x			x
Doolittle Cr.	2	Mouth	03,29N,12W	Texas		x			x
Douglas Br.	4	Mouth	13,36N,32W	Vernon		x			x
Dry Cr.	8	Mouth	25,40N,03E	Jefferson		x			x
Duck Cr.	3	Mouth	32,43N,23W	Henry	Benton		x	+1.9mi	x
Dulin Cr.	1	Mouth	09,42N,04E	Jefferson		x			x
Duncan Cr.	3	Mouth	22,38N,10W	Phelps		x			x
Durington Cr.	4	Mouth	06,34N,19W	Dallas		x			x
Dutch Cr.	2	Mouth	27,42N,03E	Jefferson		x			x
Dutro Carter Cr.	2	Mouth	Hwy 72	Phelps		x			x
Dutro Carter Cr.	1	Hwy 72	Hwy O	Phelps		x			x
Dyer Rock Cr.	6	Mouth	03,49N,24W	Lafayette		x			x
E. Fk. Bee Br.	1	Mouth	16,37N,30W	Vernon		x			x
E. Fk. Niangua R.	6	33,32N,18W	25,31N,18W	Webster			x	+1mi	x
E. Fk. Sni-a-bar Cr.	9	Mouth	Interst 70	Lafayette			x	-2.6mi; C to P	x
E. Fk. Sni-a-bar Cr.	12	Interst 70	29,48N,28W	Lafayette			x	2.6 + 9.3; C	x
Earle Br.	1	Mouth	Hwy F	Phelps		x			x
Eight Mile Cr.	17	Mouth	36,44N,31W	Cass			x	+4.8mi	x
Elk Br.	2	Mouth	08,45N,22W	Pettis		x			x
Elk Fk.	6	Mouth	04,44N,23W	Pettis			x	+3.5mi; C to P	x
Emery Hollow	4	Mouth	28,31N,10W	Texas		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Fassnight Cr.	2	27,29N,22W	25,29N,22W	Greene		x			x
Fassnight Cr.	1	25,29N,22W	30,29N,22W	Greene		x			x
Feaster Cr.	1	Mouth	31,41N,21W	Benton		x			x
Fenton Cr.	1	Mouth	Hwy V	Franklin		x			x
Fenton Cr.	1	Mouth	,43N,05E	St. Louis		x			x
Fire Prairie Cr.	14	Mouth	18,50N,30W	Jackson		x			x
Fishpot Cr.	2	Mouth	13,44N,05E	St. Louis			x	+1.5mi	x
Flat Cr.	3	Mouth	,44N,03E	St. Louis		x			x
Flat Cr.	1	Mouth	Hwy A	Franklin		x			x
Flat Rock Cr.	0	Mouth	05,40N,20W	Benton		x			x
Fleck Cr.	3	Mouth	29,32N,33W	Barton		x			x
Flinger Br.	2	Mouth	17,28N,08W	Texas		x			x
Fly Cr.	6	Mouth	02,35N,29N	Vernon		x			x
Fountain Farm Br.	2	Mouth	32,38N,03E	Washington		x			x
Fourmile Cr.	5	Mouth	29,34N,18W	Dallas		x			x
Fox Cr.	6	Mouth	30,44N,03E	St. Louis			x	+1.8mi	x
Galligher Cr.	0	Mouth	20,41N,04E	Jefferson		x			x
Galloway Cr.	3	16,28N,21W	04,28N,21W	Greene		x			x
Garrison Br.	1	23,27N,21W	23,27N,21W	Christian		x			x
Givins Cr.	4	Mouth	11,32N,19W	Webster			x	P to C; +1mi	x
Gooseneck Br.	3	Mouth	22,37N,20W	Hickory		x			x
Gower Br.	2	Mouth	09,32N,19W	Dallas		x			x
Grassy Cr.	2	Mouth	27,48N,22W	Saline	Pettis	x			x
Grassy Hollow	4	Mouth	09,28N,07W	Texas		x			x
Graveyard Br.	0	Mouth	01,42N,09W	Osage		x			x
Greasy Cr.	0	Mouth	14,45N,08W	Osage		x			x
Greasy Cr.	1	14,45N,08W	13,45N,08W	Osage		x			x
Greedy Cr.	1	Mouth	29,41N,06W	Gasconade		x			x
Greedy Cr.	1	29,41N,06W	18,41N,06W	Gasconade		x			x
Green Spring Br.	2	Mouth	02,35N,25W	St. Clair	Cedar	x			x
Greer Br.	6	Mouth	23,47N,21W	Pettis			x	+3mi	x
Greer Cr.	3	Mouth	25,32N,19W	Webster		x			x
Hackberry Br.	4	Mouth	29,35N,32W	Vernon		x			x
Hamilton Cr.	1	Mouth	14,44N,03E	St. Louis			x	P to C; +0.3mi	x
Hazelton Spring	0	Mouth	34,33N,10W	Texas		x			x
Heaths Cr.	13	Mouth	27,48N,22W	Cooper	Pettis		x	Change end-coord	x
Heaths Cr.	10	27,48N,22W	17,47N,22W	Pettis			x	Begin- & end-coord change	x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Henry Cr.	2	14,44N,22W	36,44N,22W	Pettis			x	2.3 mi. (split from 4 mi segment)	x
Henry Cr.	2	Mouth	14,44N,22W	Pettis			x	C to P; -2.3	x
Hess Cr.	3	Mouth	13,47N,22W	Pettis		x			x
Hightower Cr.	4	Mouth	30,37N,30W	Vernon		x			x
Hog Cr.	5	06,29N,09W	16,29N,09W	Texas			x	+3.6mi	x
Hogan's Fk.	6	Mouth	17,44N,26W	Johnson		x			x
Hogles Cr.	21	Mouth	32,38N,23W	Benton	Hickory		x	+4.7mi; C to P	x
Hogles Cr.	7	32,38N,23W	34,37N,23W	Hickory		x			x
Horseshoe Cr.	6	Mouth	10,48N,29W	Jackson	Lafayette	x			x
Houfs Cr.	1	Mouth	27,48N,9W	Callaway		x			x
Huldy Hollow	2	Mouth	28,31N,07W	Texas		x			x
Hunke Cr.	1	Mouth	33,43N,06W	Gasconade		x			x
Indian Cr.	7	Mouth	21,42N,20W	Benton			x	+2.2mi	x
Indian Cr.	1	Mouth	28,40N,09W	Maries		x			x
Indian Cr.	2	Mouth	Hwy DD	Osage		x			x
Indian Cr.	0	Mouth	34,44N,08W	Osage		x			x
Ingalls Cr.	6	Mouth	01,35N,21W	Hickory		x			x
Isum Cr.	0	Mouth	30,42N,03E	Jefferson		x			x
Jacktar Hollow	5	Mouth	22,32N,10W	Texas		x			x
Jakes Cr.	10	Mouth	24,35N,19W	Dallas			x	+3mi	x
Jones Br.	3	Mouth	32,33N,19W	Dallas		x			x
Jones Cr.	4	Mouth	15,41N,03E	Jefferson			x	2mi to P; +.5	x
Jordan Br.	1	Mouth	11,37N,22W	Hickory		x			x
Jordan Br.	6	Mouth	Countyline	Platte	Buchanan		x	+3.2mi	x
Jordan Cr.	4	29,29N,22W	13,29N,22W	Greene		x			x
Jowler Cr.	9	Mouth	19,54N,34W	Platte		x			x
Kaintuck Hollow Cr.	2	Mouth	15,36N,09W	Phelps		x			x
Ketchum Hollow	2	Mouth	24,22N,27W	Barry		x			x
Kiefer Cr.	1	Mouth	,44N,04E	St. Louis		x			x
Krone Br.	1	Mouth	29,40N,10W	Maries		x			x
Kruze Cr.	1	Mouth	36,41N,03E	Jefferson		x			x
L. Blue R.	39	Mouth	Longview Dam	Jackson			x	+BTG;C to P; consolidated	x
L. Deer Cr.	9	Mouth	01,38N,21W	Benton			x	+3mi	x
L. Fox Cr.	0	Mouth	31,44N,03E	St. Louis		x			x
L. Hogles Cr.	1	Mouth	09,39N,23W	Benton		x			x
L. Hogles Cr.	2	09,39N,23W	16,39N,23W	Benton		x			x
L. Horseshoe Cr.	5	Mouth	11,48N,29W	Jackson	Lafayette	x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
L. Mill Cr.	5	Mouth	33,38N,21W	Hickory		x			x
L. Muddy Cr.	7	Mouth	18,46N,22W	Pettis			x	+3.3mi	x
L. Niangua R.	7	26,36N,19W	20,35N,19W	Dallas			x	+2mi	x
L. Osage R.	16	18,37N,31W	18,37N,33W	Vernon			x	split out frm orignl 21mi; +1.3	x
L. Osage R.	6	Mouth	18,37N,31W	Vernon			x	C to P; -13.7mi	x
L. Pine Cr.	2	Mouth	12,33N,12W	Texas		x			x
L. Pomme de Terre	15	Mouth	03,37N,23W	Benton	Hickory	x			x
L. Shaver Cr.	5	Mouth	04,45N,20W	Pettis			x	+0.9mi	x
L. Shoal Cr.	3	Mouth	24,51N,32W	Clay		x			x
L. St. Francis R	28	Mouth	32,35N,07E	Madison	St. Francois		x	+4.7mi; end-coord. change	x
L. St. Francis R.	1	32,35N,07E	32,35N,07E	St. Francois			x	-4.7(added to first segment)	x
L. Tavern Cr.	1	05,39N,11W	07,39N,11W	Maries		x			x
L. Weaubleau Cr.	3	Mouth	9,36N,23W	St. Clair	Hickory		x	+0.3mi	x
LaBarque Cr.	4	Mouth	32,43N,03E	Jefferson			x	1.5 to P	x
LaBarque Cr.	4	Mouth	32,43N,3E	Jefferson			x	1.5mi C to P	x
Lake Cr.	10	12,44N,20W	17,43N,20W	Pettis	Benton		x	split out of orignl 13mi segment;+1	x
Lake Cr.	4	Mouth	12,44N,20W	Pettis	Morgan		x	C to P; -8.7mi	x
Lake Ditch	2	Mouth	01,42N,09W	Osage			x	+2mi	x
Lick Br.	7	Mouth	19,43N,29W	Cass		x			x
Lick Fk.	9	Mouth	02,50N,27W	Lafayette		x			x
Line Cr.	7	Mouth	Lake Waukomis	Platte		x			x
Little Cr.	3	Mouth	Hwy CC	Franklin		x			x
Long Br.	5	06,45N,23W	09,45N,24W	Pettis	Johnson		x	+2.8mi; C to P; split frm orignl 7mi	x
Long Br.	2	Mouth	24,40N,11W	Maries		x			x
Long Br.	3	Mouth	33,37N,19W	Camden		x			x
Long Br.	1	Mouth	27,45N,25W	Johnson		x			x
Long Grove Br.	1	Mouth	31,48N,20W	Pettis			x	-2.1mi; C to P	x
Long Grove Br.	3	31,48N,20W	07,47N,20W	Pettis			x	2.1mi split from orignl 3mi + 0.9mi	x
Luther Br.	1	Mouth	32,38N,06W	Phelps		x			x
Luzon Br.	1	13,44N,10W	24,44N,10W	Osage		x			x
Luzon Br.	1	Mouth	13,44N,10W	Osage		x			x
Mag Cr.	0	Mouth	26,40N,10W	Maries		x			x
Mahans Cr.	4	09,28N,04W	28,28N,04W	Shannon			x	+2.1mi	x
Mammoth Cr.	0	Mouth	11,39N,03E	Jefferson		x			x
Martin Br.	1	Mouth	2,40N,04W	Franklin		x			x
Mary's Cr.	1	Mouth	03,39N,01W	Washington		x			x
Mattese Cr.	1	Mouth	Baumgartner Rd	St. Louis		x			x

TABLE 2.2 - Streams Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Maupin Cr.	1	Mouth	36,41N,02E	Jefferson		x			x
May Br.	1	Mouth	Hwy AN	Franklin		x			x
May Br.	4	Mouth	30,48N,22W	Saline	Pettis	x			x
Mayhen Br.	1	Mouth	18,28N,08W	Texas		x		Is spelling correct? (i.e., Mayhan?)	x
McCarty Cr.	10	Mouth	31,34N,29W	Vernon			x	+5.6mi	x
McGee Br.	4	Mouth	03,44N,20W	Pettis		x			x
McKenzie Cr.	4	Mouth	06,37N,29W	Vernon		x			x
Melton Cr.	2	Mouth	21,36N,29W	Vernon		x			x
Middle Fork	3	Mouth	20,43N,03W	Franklin		x			x
Middlebrook Cr.	1	Mouth	08,34N,04E	St. Francois		x			x
Mill Cr.	3	09,37N,21W	15,37N,21W	Hickory		x			x
Mill Cr.	6	Mouth	09,37N,21W	Hickory			x	+1.2mi; C to P	x
Mill Cr.	4	Mouth	17,46N,33W	Jackson	Cass	x			x
Mill Cr.	0	Mouth	Hwy FF	Maries		x			x
Mill Cr.	1	Hwy FF	22,39N,08W	Maries		x			x
Mineral Cr.	4	Mouth	20,44N,25W	Johnson		x			x
Mineral Spring Hollow	1	Mouth	30,31N,09W	Texas		x			x
Mission Cr.	2	Hwy 45	17,54N,36W	Platte		x			x
Moore Br.	4	Mouth	27,35N,31W	Vernon			x	+1.8mi	x
Mossy Cr.	0	Mouth	07,40N,21W	Benton		x			x
Mountain Cr.	6	Mouth	23,35N,17W	Laclede		x			x
Mud Cr.	1	Mouth	08,34N,04E	St. Francois		x			x
Muddy Cr.	55	Mouth	17,45N,23W	Pettis	Johnson		x	+26mi	x
Muddy Cr.	8	17,45N,23W	34,45N,24W	Pettis	Johnson		x	-24.8mi	x
Mulberry Cr.	4	Mouth	04,34N,29W	Vernon		x			x
N. Fk. Charrette Cr.	5	35,46N,02W	34,47N,02W	Warren		x			x
N. Fk. Jones Cr.	1	Mouth	15,41N,03E	Jefferson		x			x
N. Flat Cr.	4	Mouth	22,44N,23W	Pettis		x			x
New Hope Cr.	5	Mouth	31,54N,30W	Clay			x	+3.1mi	x
Norman Cr.	7	Mouth	08,36N,06W	Phelps		x			x
Olive Br.	1	Mouth	17,46N,20W	Pettis		x			x
Owl Cr.	5	Mouth	24,54N,35W	Platte		x			x
Owl Cr.	3	Mouth	27,49N,28W	Lafayette		x			x
P.D. Cr.	0	Mouth	28,40N,21W	Benton		x			x
Painter Cr.	3	Mouth	33,48N,20W	Pettis		x			x
Panther Cr.	8	Mouth	13,35N,24W	Polk	Hickory	x			x
Panther Cr.	3	Mouth	18,28N,11W	Texas		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Panther Hollow	1	Mouth	10,27N,07W	Howell		x			x
Pearson Cr.	8	Mouth	5,29N,20W	Greene			x	+1mi	x
Pin Oak Cr.	3	Mouth	03,42N,04W	Franklin		x			x
Pin Oak Cr.	2	Mouth	11,39N,07W	Maries		x			x
Pine Br.	4	Mouth	01,28N,08W	Texas		x			x
Pippin Br.	1	Mouth	26,37N,20W	Hickory		x			x
Pippin Br.	3	26,37N,20W	28,37N,20W	Hickory		x			x
Plattin Cr.	24	Mouth	01,38N,05E	Jefferson	St. Francois		x	+6mi. to P	x
Plattin Cr.	3	17,38N,05E	17,38N,06E	St. Francois			x	+1mi net gain; questionable coordi	x
Pleasant Run Cr.	7	Mouth	28,34N,31W	Vernon		x		Was this Pleasant Cr before?	x
Pomme Cr.	2	Mouth	32,43N,06E	Jefferson			x	+1mi	x
Pomme de Terre R.	21	Mouth	Pomme de Terr	Hickory			x	+3mi	x
Pond Spring Br.	2	Mouth	15,30N,08W	Texas		x			x
Poney Cr.	3	Mouth	13,44N,33W	Cass		x			x
Poney Cr.	9	13,44N,33W	Stateline	Cass		x			x
Prairie Cr.	3	Mouth	35,39N,22W	Benton		x			x
Prairie Cr.	2	Mouth	36,39N,11W	Maries		x			x
Prairie Cr.	4	Mouth	04,32N,12W	Texas	Laclede	x			x
Prairie Hollow	7	Mouth	04,37N,18W	Camden		x			x
Pryor Cr.	3	Mouth	08,37N,32W	Vernon		x			x
Purcett Br.	2	Mouth	05,35N,25W	St. Clair	Cedar	x			x
Ragan Br.	4	Mouth	20,36N,07W	Phelps		x			x
Reed Cr.	2	Mouth	11,37N,32W	Vernon		x			x
Reid Cr.	22	Mouth	30,35N,3E	Washington	Iron	x			x
Roaring Spring	0	Mouth	35,33N,10W	Texas		x			x
Roark Cr.	4	36,23N,22W	15,23N,22W	Taney		x			x
Robinson Br.	2	Mouth	30,36N,29W	Vernon		x			x
Robinson Cr.	3	Mouth	Hwy B	Phelps		x			x
Rock Br.	2	Mouth	10,32N,10W	Texas		x			x
Rock Cr.	2	Mouth	30,64N,41W	Atchison		x			x
Rock Cr.	4	Mouth	Hwy 92	Clay		x			x
Rocky Br.	3	Mouth	11,52N,33W	Clay		x			x
Rocky Br.	0	Mouth	23,39N,02E	Washington		x			x
Rocky Fk.	0	Mouth	04,35N,01W	Washington		x			x
Rocky Hollow	1	Mouth	08,35N,29W	Vernon		x			x
Rogers Cr.	9	Mouth	28,28N,02W	Carter			x	+4.9mi; no change in coord.	x
Rush Cr.	8	Mouth	Hwy H	Clay		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
S. Davis Cr.	6	Mouth	22,48N,27W	Lafayette			x	+3.4mi	x
S. Dry Sac R.	2	5,29N,20W	3,29N,20W	Greene		x			x
S. Fk. Brush Cr.	5	Mouth	03,34N,24W	Polk		x			x
S. Flat Cr.	7	Mouth	27,43N,22W	Pettis	Benton		x	+2.1mi; C to P	x
S. Grand R.	48	Mouth	2,44N,33W	Henry	Cass	x			x
Sadler Br.	1	Mouth	17,35N,24W	Polk		x			x
Salley Br.	0	Mouth	27,39N,22W	Benton		x			x
Sand Cr.	2	Mouth	34,36N,06E	St. Francois		x			x
Sand Cr.	1	Mouth	18,42N,4E	Jefferson		x			x
Sand Hollow	0	Mouth	24,31N,10W	Texas		x			x
Sara Br.	3	Mouth	01,32N,18W	Webster		x			x
School Hollow Cr.	1	Mouth	07,41N,09W	Osage		x			x
Schoolhouse Hollow	0	Mouth	19,31N,09W	Texas		x			x
Schuler Cr.	3	26,28N,23W	28,28N,23W	Greene		x			x
Schuler Cr.	0	Mouth	Hwy 50	Gasconade		x			x
Schulte Cr.	5	Mouth	10,32N,21W	Polk			x	Name change from Schultz	x
Shaver Cr.	14	Mouth	06,45N,20W	Pettis			x	+5.4mi;	x
Shawnee Cr.	10	30,29N,03W	19,28N,03W	Shannon		x			x
Short Cr.	1	30,22N,21W	36,22N,21W	Taney		x			x
Short Cr.	3	Mouth	30,22N,21W	Taney		x			x
Shuld Br.	2	Mouth	26,28N,09W	Texas		x			x
Silver Cr.	2	Mouth	01,23N,21W	Taney		x			x
Skinner Cr.	1	Mouth	09,42N,03W	Franklin		x			x
Skullbones Cr.	1	Mouth	35,42N,03E	Jefferson		x			x
Slabtown Br.	3	Mouth	23,33N,10W	Texas		x			x
Smiley Cr.	3	Mouth	36,46N,17W	Cooper		x			x
Smith Hollow Cr.	2	26,37N,10W	36,37N,10W	Phelps		x			x
Smith Hollow Cr.	1	Mouth	26,37N,10W	Phelps		x			x
Soap Cr.	4	19,42N,04W	11,42N,05W	Gasconade		x			x
Soap Cr.	1	Mouth	19,42N,04W	Gasconade		x			x
South Cr.	4	07,28N,22W	34,29N,22W	Greene		x			x
South Dry Sac. Cr.	2	5,29N,20W	3,29N,20W	Greene		x			x
South Dry Sac. Cr.	2	Mouth	36,30N,22W	Greene		x			x
South Fk.	14	Mouth	08,46N,23W	Saline	Pettis		x	+3.5mi	x
Spring Cr.	4	Mouth	24,49N,01W	Lincoln		x			x
Spring Fk.	6	16,44N,21W	01,43N,21W	Pettis	Benton	x		4.3 + 2 = C	x
Spring Fk.	5	Mouth	16,44N,21W	Pettis			x	split segment; -4.3mi ; C to P	x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Spring Hollow	10	Bennett Sprg	27,34N,17W	Laclede		x			x
Spurlock Hollow	3	Mouth	15,30N,11W	Texas		x			x
Starks Cr.	12	Mouth	12,37N,21W	Hickory			x	+3.5mi (Starkes?)	x
Starks Cr.	3	12,37N,21W	31,37N,20W	Hickory			x	-2.0mi; 3.5mi converted to P	x
Steuber Hollow Cr.	1	Mouth	13,41N,09W	Osage		x			x
Stick Br.	0	Mouth	21,36N,21W	Hickory		x			x
Stoak Cr.	2	Mouth	14,45N,26W	Johnson		x			x
Sugar Cr.	15	Mouth	33,44N,30W	Cass			x	+10.1mi	x
Sugar Cr.	9	Mouth	23,41N,11W	Miller	Maries	x			x
Swede Br.	0	Mouth	32,37N,21W	Hickory		x			x
Sweet Hollow	3	Mouth	27,36N,17W	Laclede		x			x
Tabo Cr.	12	Mouth	27,50N,26W	Lafayette			x	+6mi	x
Tabo Cr.	9	27,50N,26W	20,49N,26W	Lafayette			x	+2.9mi; 6mi converted to P	x
Taylor Br.	1	Mouth	Countyline	St. Francois		x			x
Tiff Cr.	2	Mouth	04,38N,04E	Jefferson		x			x
Toby Hollow	2	Mouth	Toby Sprg	Camden		x			x
Townsend Slough	2	Mouth	21,37N,32W	Vernon		x			x
Trib. to Atwell Cr.	3	Mouth	05,38N,11W	Miller	Maries	x			x
Trib. to Bailey's Cr.	1	Mouth	06,45N,06W	Gasconade		x			x
Trib. to Bailey's Cr.	1	Mouth	32,45N,07W	Osage		x			x
Trib. to Barren Fork	2	Mouth	36,44N,05W	Gasconade		x			x
Trib. to Basin Fk.	2	Mouth	23,44N,23W	Pettis		x			x
Trib. to Bates Cr.	1	Mouth	16,37N,02E	Washington		x			x
Trib. to Beaver Dam Ck.	1	Mouth	24,47N,23W	Pettis		x			x
Trib. to Beaver Dam Ck.	1	Mouth	25,47N,23W	Pettis		x			x
Trib. to Big Br.	1	Mouth	14,44N,04W	Franklin		x			x
Trib. to Big Buffalo Cove	1	Mouth	35,41N,20W	Benton		x			x
Trib. to Big Buffalo Cr.	0	Mouth	12,41N,20W	Benton		x			x
Trib. to Big Cr.	4	Mouth	Lake Harrisonvill	Cass		x			x
Trib. to Big R.	1	Mouth	21,37N,05E	St. Francois		x			x
Trib. to Bird Br.	1	Mouth	14,41N,22W	Benton		x			x
Trib. to Blackwater R.	2	Mouth	29,48N,23W	Pettis		x			x
Trib. to Blackwater R.	1	Mouth	19,48N,22W	Saline	Pettis	x			x
Trib. to Blackwater R.	1	Mouth	24,48N,22W	Saline	Pettis	x			x
Trib. to Blackwater R.	1	Mouth	21,48N,23W	Pettis		x			x
Trib. to Boeuf Cr.	2	Mouth	30,43N,4W	Gasconade		x			x
Trib. to Boeuf Cr.	1	Mouth	08,42N,04W	Gasconade		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Trib. to Boeuf Cr.	0	Mouth	12,43N,04W	Franklin		x			x
Trib. to Boone Cr.	0	Mouth	15,40N,03W	Crawford		x			x
Trib. to Bourbeuse R.	2	14,40N,06W	Hwy B	Gasconade		x			x
Trib. to Bourbeuse R.	0	Mouth	14,40N,06W	Gasconade		x			x
Trib. to Brush Cr.	0	Mouth	26,39N,05W	Crawford		x			x
Trib. to Brush Cr.	0	Mouth	28,36N,25W	St. Clair		x			x
Trib. to Brush Cr.	1	Mouth	30,36N,25W	St. Clair		x			x
Trib. to Camp Br.	1	Mouth	23,45N,22W	Pettis		x			x
Trib. to Camp Br.	1	Mouth	24,45N,22W	Pettis		x			x
Trib. to Camp Br.	0	Mouth	29,45N,22W	Pettis		x			x
Trib. to Camp Cr.	1	Mouth	Hwy EE	St. Francois		x			x
Trib. to Clear Cr.	2	Mouth	26,39N,06W	Phelps		x			x
Trib. to Clear Cr.	0	Mouth	14,44N,25W	Johnson		x			x
Trib. to Clear Cr.	1	Mouth	32,34W,30W	Vernon		x			x
Trib. to Clear Cr.	2	Mouth	05,34N,30W	Vernon		x			x
Trib. to Clear Cr.	1	Mouth	28,42N,23W	Benton		x			x
Trib. to Clear Fk.	1	Mouth	15,44N,25W	Johnson		x			x
Trib. to Clear Fk.	2	Mouth	04,44N,25W	Johnson		x			x
Trib. to Coon Cr.	1	Mouth	12,45N,22W	Pettis		x			x
Trib. to Coon Cr.	1	Mouth	11,45N,22W	Pettis		x			x
Trib. to Crane Cr.	1	Mouth	29,37N,21W	Hickory		x			x
Trib. to Crane Cr.	0	Mouth	32,37N,21W	Hickory		x			x
Trib. to Crane Cr.	0	Mouth	01,36N,21W	Hickory		x			x
Trib. to Crane Cr.	0	Mouth	01,36N,21W	Hickory		x			x
Trib. to Crane Cr.	1	Mouth	34,37N,21W	Hickory		x			x
Trib. to Crane Cr.	1	Mouth	14,36N,21W	Hickory		x			x
Trib. to Crane Cr.	1	Mouth	14,36N,21W	Hickory		x			x
Trib. to Crider Cr.	1	Mouth	Hwy NN	Osage		x			x
Trib. to Deer Cr.	1	Mouth	33,45N,08W	Osage		x			x
Trib. to Deer Cr.	2	33,45N,08W	04,44N,08W	Osage		x			x
Trib. to Deer Cr.	0	Mouth	06,39N,20W	Benton		x			x
Trib. to Deer Cr.	1	Mouth	28,40N,20W	Benton		x			x
Trib. to Dry Fk. Cr.	1	Mouth	34,37N,07W	Phelps		x			x
Trib. to Dry Fk. Cr.	0	Mouth	27,38N,06W	Phelps		x			x
Trib. to E. Fk Postoak Cr	2	Mouth	34,45N,26W	Johnson		x			x
Trib. to E. Fk Postoak Cr	4	Mouth	23,44N,26W	Johnson		x			x
Trib. to E. Fk. Sni-a-bar	5	Mouth	22,48N,28W	Lafayette		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Trib. to E. Fk. Sni-a-bar	3	Mouth	30,48N,28W	Lafayette		x			x
Trib. to Elk Br.	0	Mouth	32,46N,22W	Pettis		x			x
Trib. to Elk Fk.	0	Mouth	16,44N,23W	Pettis		x			x
Trib. to Flat Cr.	3	Mouth	28,24N,26W	Barry		x			x
Trib. to Flat Cr.	2	Mouth	26,22N,28W	Barry		x			x
Trib. to Flat Cr.	2	Mouth	13,45N,20W	Pettis		x			x
Trib. to Flat Cr.	1	Mouth	10,44N,22W	Pettis		x			x
Trib. to Flat Cr.	1	Mouth	19,44N,22W	Pettis		x			x
Trib. to Flat Cr.	2	Mouth	07,43N,22W	Pettis		x			x
Trib. to Flat Cr.	1	Mouth	18,45N,21W	Pettis		x			x
Trib. to Flat Cr.	1	Mouth	24,45N,22W	Pettis		x			x
Trib. to Flat Cr.	2	Mouth	15,45N,20W	Pettis		x			x
Trib. to Flat Cr.	2	Mouth	18,45N,20W	Pettis		x			x
Trib. to Fleck Cr.	2	Mouth	28,32N,33W	Barton		x			x
Trib. to Gasconade R.	1	Mouth	Hwy N	Osage		x			x
Trib. to Heaths Cr.	4	Mouth	28,47N,22W	Pettis		x			x
Trib. to Heaths Cr.	2	Mouth	20,47N,22W	Pettis		x			x
Trib. to Heaths Cr.	1	Mouth	08,47N,21W	Pettis		x			x
Trib. to Heaths Cr.	1	Mouth	32,48N,21W	Pettis		x			x
Trib. to Henry Cr.	1	Mouth	31,44N,21W	Pettis	Benton	x			x
Trib. to Hess Cr.	1	Mouth	18,47N,21W	Pettis		x			x
Trib. to Hogan's Fk.	2	Mouth	13,44N,27W	Johnson		x			x
Trib. to Hogles Cr.	1	Mouth	32,39N,23W	Benton		x			x
Trib. to Hogles Cr.	3	Mouth	22,37N,23W	Hickory		x			x
Trib. to Indian Cr.	2	Mouth	34,42N,20W	Benton		x			x
Trib. to Indian Cr.	1	Mouth	Hwy 42	Maries		x			x
Trib. to Indian Cr.	0	Mouth	07,35N,01W	Washington		x			x
Trib. to Indian Cr.	1	Hwy W	27,35N,04E	St. Francois		x			x
Trib. to Indian Cr.	0	Mouth	12,40N,01W	Franklin		x			x
Trib. to Indian Cr.	1	Mouth	Hwy W	St. Francois		x			x
Trib. to Indian Cr.	0	Mouth	35,42N,21W	Benton		x			x
Trib. to Knobby Cr.	1	Mouth	36,40N,20W	Benton		x			x
Trib. to L. Bourbeuse R.	0	Mouth	04,39N,07W	Maries		x			x
Trib. to L. Bourbeuse R.	1	Mouth	02,39N,04W	Crawford		x			x
Trib. to L. Drywood Cr.	1	Mouth	02,34N,32W	Vernon		x			x
Trib. to L. Indian Cr.	0	Mouth	32,38N,03W	Washington		x		Same as Trib. to Indian Cr.?	x
Trib. to L. Mill Cr.	1	Mouth	24,38N,22W	Hickory		x			x

TABLE 2.2 - Streams Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Trib. to L. Muddy Cr.	0	Mouth	14,46N,22W	Pettis		x			x
Trib. to L. Muddy Cr.	2	Mouth	04,46N,22W	Pettis		x			x
Trib. to L. Muddy Cr.	0	Mouth	14,46N,22W	Pettis		x			x
Trib. to L. Muddy Cr.	3	Mouth	06,46N,22W	Pettis		x			x
Trib. to L. Pomme de Terre	2	Mouth	09,38N,22W	Benton	Hickory	x			x
Trib. to L. Tavern Cr.	1	Mouth	15,40N,11W	Maries		x			x
Trib. to L. Tavern Cr.	1	Mouth	22,40N,11W	Maries		x			x
Trib. to L. Tavern Cr.	1	Mouth	27,40N,11W	Maries		x			x
Trib. to L. Tavern Cr.	1	Mouth	34,40N,11W	Maries		x			x
Trib. to L. Tebo Cr.	1	Mouth	21,42N,22W	Benton		x			x
Trib. to L. Tebo Cr.	2	Mouth	30,42N,22W	Benton		x			x
Trib. to L. Weaubleau Cr.	1	Mouth	12,36N,23W	Hickory		x			x
Trib. to Lake Cr.	4	Mouth	02,43N,20W	Pettis	Benton	x			x
Trib. to Lake Cr.	1	Mouth	09,43N,20W	Benton		x			x
Trib. to Lake Cr.	1	Mouth	20,43N,20W	Benton		x			x
Trib. to Long Br.	0	Mouth	07,45N,23W	Pettis		x			x
Trib. to Maries R.	3	Mouth	21,42N,10W	Osage		x			x
Trib. to Maries R.	2	Mouth	Hwy V	Maries		x			x
Trib. to Maries R.	0	Mouth	18,38N,10W	Maries		x			x
Trib. to Maries R.	1	Mouth	14,38N,11W	Maries		x			x
Trib. to Maries R.	1	Mouth	06,39N,10W	Maries		x			x
Trib. to Maries R.	0	Mouth	09,38N,11W	Maries		x			x
Trib. to Maries R.	1	Mouth	11,39N,11W	Maries		x			x
Trib. to Maries R.	2	Mouth	09,40N,10W	Maries		x			x
Trib. to Meramec R.	1	Mouth	04,38N,03W	Crawford		x			x
Trib. to Mill Cr.	0	Mouth	10,40N,08W	Maries		x			x
Trib. to Mill Cr.	0	Mouth	14,37N,21W	Hickory		x			x
Trib. to Mill Cr.	1	Mouth	16,37N,21W	Hickory		x			x
Trib. to Mineral Cr.	1	Mouth	18,44N,25W	Johnson		x			x
Trib. to Missouri R.	3	Mouth	07,44N,01W	Franklin		x			x
Trib. to Muddy Cr.	2	Mouth	24,46N,23W	Pettis		x			x
Trib. to Muddy Cr.	1	Mouth	06,45N,22W	Pettis		x			x
Trib. to Muddy Cr.	1	Mouth	32,46N,22W	Pettis		x			x
Trib. to Muddy Cr.	2	Mouth	10,46N,21W	Pettis		x			x
Trib. to Muddy Cr.	1	Mouth	04,45N,22W	Pettis		x			x
Trib. to N. Fk. Cuivre R.	2	Mouth	25,51N,2W	Lincoln		x			x
Trib. to Old Town Br.	1	Mouth	01,36N,31W	Vernon		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Trib. to Pierce Cr.	1	Mouth	31,41N,02E	Franklin		x			x
Trib. to Pierce Cr.	1	Mouth	06,40N,02E	Franklin		x			x
Trib. to Pippin Br.	2	Mouth	29,37N,20W	Hickory		x			x
Trib. to Pippin Br.	1	Mouth	26,37N,20W	Hickory		x			x
Trib. to Pomme de Terre R	1	Mouth	30,36N,22W	Hickory		x			x
Trib. to Red Oak Cr.	2	35,42N,05W	27,42N,05W	Gasconade		x			x
Trib. to Red Oak Cr.	1	Mouth	35,42N,05W	Gasconade		x			x
Trib. to S. Fk. Blackwate	1	Mouth	04,46N,23W	Pettis		x			x
Trib. to S. Fk. Weaubleau	6	Mouth	25,36N,24W	St. Clair	Hickory	x			x
Trib. to Sandy Cr.	0	Mouth	33,42N,04E	Jefferson		x			x
Trib. to Sandy Cr.	0	Mouth	32,42N,04E	Jefferson		x			x
Trib. to Shaver Cr.	1	Mouth	11,46N,20W	Pettis		x			x
Trib. to Shaver Cr.	1	Mouth	06,45N,20W	Pettis		x			x
Trib. to Shaver Cr.	1	Mouth	28,46N,20W	Pettis		x			x
Trib. to Spring Cr.	1	Mouth	14,38N,08W	Phelps		x			x
Trib. to Spring Cr.	1	Mouth	26,35N,10W	Phelps		x			x
Trib. to Spring Cr.	1	14,38N,08W	10,38N,08W	Phelps		x			x
Trib. to Spring Fk.	1	Mouth	36,44N,21W	Pettis			x	+0.2mi	x
Trib. to Spring Fk.	2	Mouth	02,43N,21W	Pettis	Benton	x			x
Trib. to St. Francis R.	1	Mouth	9,35N,4E	St. Francois		x			x
Trib. to Starks Cr.	1	Mouth	18,37N,20W	Hickory		x			x
Trib. to Starks Cr.	1	Mouth	19,37N,20W	Hickory		x			x
Trib. to Starks Cr.	2	Mouth	18,38N,20W	Hickory		x			x
Trib. to Starks Cr.	1	Mouth	32,38N,20W	Hickory		x			x
Trib. to Starks Cr.	1	Mouth	02,37N,21W	Hickory		x			x
Trib. to Stouts Cr.	1	Mouth	36,34N,03E	Iron		x			x
Trib. to Tavern Cr.	0	Mouth	01,44N,02E	Franklin		x			x
Trib. to Terre Bleue Cr.	2	Mouth	32,38N,05E	St. Francois		x			x
Trib. to Terre Bleue Cr.	1	32,38N,05E	28,38N,05E	St. Francois		x			x
Trib. to trib. to Heaths	1	Mouth	27,47N,22W	Pettis		x			x
Trib. to trib. to Wolf Cr	1	Mouth	Hwy 32	St. Francois		x			x
Trib. to Turkey Cr.	2	Mouth	14,38N,21W	Hickory		x			x
Trib. to Turkey Cr.	0	Mouth	09,38N,21W	Hickory		x			x
Trib. to Turkey Cr.	1	Mouth	23,38N,21W	Hickory		x			x
Trib. to Turkey Cr.	1	Mouth	20,47N,21W	Pettis		x			x
Trib. to Turkey Cr.	2	Mouth	33,39N,21W	Benton		x			x
Trib. to W. Fk. Clear Cr.	1	Mouth	35,36N,30W	Vernon		x			x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Trib. to Wallace Cr.	2	Mouth	07,40N,06W	Gasconade		x			x
Trib. to Weaubleau Cr.	1	Mouth	26,36N,23W	Hickory		x			x
Trib. to Weaubleau Cr.	2	Mouth	23,36N,23W	Hickory		x			x
Trib. to Weaubleau Cr.	1	Mouth	15,36N,23W	Hickory		x			x
Trib. to Weaubleau Cr.	1	Mouth	02,35N,23W	Hickory		x			x
Trib. to Weaubleau Cr.	1	Mouth	19,36N,23W	Hickory		x			x
Trib. to Weaubleau Cr.	1	Mouth	3,35N,23W	Hickory		x			x
Trib. to Wolf Cr.	2	Hwy 32	Hwy D	St. Francois		x			x
Trib. to Wolf Cr.	1	Mouth	Hwy 32	St. Francois		x			x
Troesser Cr.	0	Mouth	Hwy C	Osage		x			x
Tunas Br.	3	Mouth	33,36N,19W	Dallas		x			x
Turkey Cr.	3	Mouth	20,47N,21W	Pettis			x	+1.1mi	x
Turkey Cr.	6	05,38N,21W	22,38N,21W	Benton	Hickory	x			x
Turkey Cr.	2	Mouth	Hwy 47	St. Francois		x			x
Turkey Cr.	16	Mouth	05,38N,21W	Benton		x			x
Tyrey Cr.	1	12,40N,02E	11,40N,02E	Jefferson		x			x
Vance Br.	1	Mouth	05,39N,22W	Benton		x			x
W. Br. Crawford Cr.	12	Mouth	21,47N,30W	Cass	Jackson		x	+10.2mi	x
W. Br. Crawford Cr.	12	Mouth	21,47N,30W	Jackson		x			x
W. Elk Fk.	3	Mouth	05,44N,23W	Pettis		x			x
W. Fk. Clear Cr.	12	Mouth	17,35N,30W	Vernon			x	+6.6mi	x
W. Fk. East Cr.	5	Mouth	26,46N,33W	Cass		x			x
W. Fk. Jones Cr.	1	Mouth	16,41N,03E	Jefferson		x			x
Wallace Cr.	2	05,40N,06W	07,40N,06W	Gasconade		x			x
Wallace Cr.	3	Mouth	05,40N,06W	Gasconade		x			x
Walnut Cr.	2	Mouth	03,34N,30W	Vernon		x			x
Walnut Cr.	1	Mouth	25,45N,21W	Pettis			x	C to P; -3.4mi; split from 4.5mi	x
Walnut Cr.	3	25,45N,21W	2,44N,21W	Pettis			x	split out from orignl 4.5mi segment	x
Walnut Cr.	3	Mouth	12,45N,23W	Pettis		x			x
Ward Br.	3	Mouth	13,28N,22W	Greene			x	+1.8mi	x
Warm Fk. Spring R.	10	25,23N,06W	08,23N,06W	Howell			x	-3mi;	x
Warm Fk. Spring R.	12	State Line	25,23N,06W	Oregon			x	+3mi (to class P)	x
Weaubleau Cr.	33	Mouth	03,35N,23W	St. Clair	Hickory		x	+15mi	x
Wellson Slough	6	Mouth	Hwy 45	Platte		x			x
Wilkerson Creek	7	Mouth	07,52N,32W	Clay			x	+3.4mi	x
Williams Cr.	1	Mouth	I-44	St. Louis		x			x
Williams Cr.	3	11,42N,21W	05,42N,20W	Benton		x		1.5 added to 2nd segment	x

TABLE 2.2 - Streams
Approved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln	Approved
Williams Cr.	5	Mouth	11,42N,21W	Benton			x	-1.5mi; +CLF;Duplicate on register	x
Willow Br.	2	Mouth	05,37N,31W	Vernon		x			x
Wilson Cr.	1	Mouth	12,35N,30W	Vernon		x			x
Wilson Cr.	1	16,29N,22W	10,29N,22W	Greene		x			x
Wolf Cr.	5	Mouth	10,27N,08W	Texas	Howell	x			x
Workman Br.	1	22,28N,22W	15,28N,22W	Greene		x			x
Wyrick Br.	1	Mouth	10,28N,09W	Texas		x			x
Yoga Spring	0	Mouth	29,30N,07W	Texas		x			x

TABLE 3

MISSOURI SURFACE WATER QUALITY CRITERIA
DISAPPROVAL SUMMARY

(Missouri uses a 1 x 10^{-6} Human Health Risk Factor)

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
3.A PRIORITY POLLUTANTS									
Cadmium 7440439 (H = 150 mg/L)	6.6	Use Specific (see 3.C)	3.0	Use Specific (see 3.C)					
Copper 7440508 (H = 150 mg/L)	19.7	Use Specific (see 3.C)	12.7	Use Specific (see 3.C)					
Lead 7439921 (H = 150 mg/L)			4	16					
Zinc 7440666 (H = 150 mg/L)	165	Use Specific (see 3.C)	165	Use Specific (see 3.C)					
2,3,7,8-TCDD Dioxin 1746016					3 E-08	3 E-05	1.3E-8		
1,2-Dichloropropane 78875					S	100	0.52		

TABLE 3

MISSOURI SURFACE WATER QUALITY CRITERIA
DISAPPROVAL SUMMARY

Missouri uses a 1 x 10^{-6} Human Health Risk Factor)

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
Trihalomethanes					80	100			N[1]
4-4'-DDT 50293					No STD	0.002	0.00059	0.00059	0.002
4-4'-DDE 72559					No STD	0.002	0.00059	0.00059	0.002
4-4'-DDD 72548					No STD	0.002	0.00083	0.00084	0.002
3.B NON-PRIORITY POLLUTANTS									
Ether, Bis Chloromethyl 542881					No STD	0.00016	0.00013	0.00078	0.07
Pentachlorobenzene 608935					No STD	74	3/S	4/1	85
Tetrachlorobenzene, 1,2,4, 5-95943					No STD	38	2/3		

[1] Removed

TABLE 3

MISSOURI SURFACE WATER QUALITY CRITERIA
DISAPPROVAL SUMMARY

(Missouri uses a 1×10^{-6} Human Health Risk Factor)

3.C Disapproved Missouri Aquatic Life Use Criteria for Site Specific Application for Selected Metals (µg/L)

(Hardness = 150 mg/L as $CaCO_3$)

Pollutant	Lakes		CWF		GWWF		LWWF	
	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic
Cadmium	49	9.1			49	11.8	68	16.4
Copper	43	28	43	28	43	28	64	41
Zinc			264	236	371	340	1623	1483

TABLE 4.1 - Lakes
Disapproved

WATERBODY	CLASS	COUNTY	LOCATION	ACRES	Modified	Expln	Disapproved
Appleton City Lake	L3	Bates	12,39N,29W	36	X	-DWS	X
Atlanta Lake	L3	Macon	SE SW 29,59N,14W	14	X	-DWS	X
Bee Tree Lake	L3	St. Louis	3,42N,6E	9	X	-WBC	X
Concordia Lake	L1	Layfayette	NW SW20,48N,24W	245	X	Deleted	X
Ethel Lake	L3	Macon	NE NW 36,59N,17W	23	X	-DWS	X
Gower Lake	L3	Clinton	3,55N,33W	14	X	-DWS	X
Higginsville N. Lake	L3	Lafayette	NW SW 9,49N,25W	40	X	-DWS	X
Linneus Lake	L1	Linn	NE SW 36,59N,21W	15	X	-DWS	X
Moberly Park Lake	L3	Randolph	SE NE 3,53N,14W	35	X	-DWS	X
Monroe City Lake A	L3	Monroe	NW NW 13,56N,8W	17	X	-DWS	X
New Cambria Lake	L3	Macon	SW NE 7,57N,16W	7	X	-DWS	X
Odessa Lake (Old)	L3	Lafayette	NW NW 14,48N,28W	19	X	-DWS	X
Peculiar Lake	L3	Cass	SE SW 22,45N,32W	25	X	-DWS	X
Perry Lake #1	L3	Ralls	NW NW 34,54N,7W	18	X	-DWS	X
Perry Lake #2	L3	Ralls	NW 34,54N,7W	7	X	-DWS	X
Pomona Lake	L3	Howell	NE SW26,26N,9W	86	X	Deleted	X
Shelbyville Lake	L3	Shelby	SW SE 19,58N,10W	32	X	L1 to L3; -DWS	X
Trenton Lower Lake	L3	Grundy	NE SE 15,61N,24W	103	X	-DWS	X
Trenton Upper Lake	L3	Grundy	NE SE 15,61N,24W	68	X	-DWS	X
Turner Lake	L3	Dent	17,34N	17	X	Deleted	X
Ziske Lake	L3	Dent	17,34N,7W	30	X	Deleted	X

TABLE 4.2 - Streams
Disapproved

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	Modified	Expln
Big Buffalo Cr.	4	Mouth	12,41N,20W	Benton	Morgan	x	-1.6mi, -WBC, -BTG, +CLF
Brush Cr.	4	31,36N,24W	16,35N,24W	Polk		x	Deleted
Brushy Fk.	1	Mouth	30,46N,21W	Pettis		x	deleted
Calico Cr.	2	36,40N,02E	02,39N,02E	Washington		x	-WBC; split from orignl 4mi segment
Calico Cr.	3	Mouth	36,40N,02E	Jefferson	Washington	x	C to P; split from 4mi segment;-WBC
Flat Cr.	45	Mouth	11,43N,23W	Morgan	Pettis	x	+22.8mi. to P; -WBC

TABLE 5

MISSOURI SURFACE WATER QUALITY CRITERIA
TRIENNIAL REVIEW

(Missouri uses a 1 x 10^{-6} Human Health Risk Factor)

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org. +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org. ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
5.A PRIORITY POLLUTANTS									
Lead 7439921 (H = 150 mg/L)	100	104							
Silver 7440224 (H = 150 mg/L)	6.9	7							
Chlorodibromomethane 124481								34	35
Methylene Chloride 75092					No STD	5	4.7		
Bromoform (THM)								360	365
2,4,6-Trichlorophenol 88062								6.5	7

TABLE 5

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5.B NON-PRIORITY POLLUTANTS									
Tetrachloroethylene					5	5	0.8	8.85	9.0[1]
Nitrosopyrrolidine, N 930552							0.16	9.19	93

[1] Existing Criterion

TABLE 5

MISSOURI SURFACE WATER QUALITY CRITERIA
TRIENNIAL REVIEW

(Missouri uses a 1 x 10^{-6} Human Health Risk Factor)

POLLUTANT	EPA 304(a) CMC Acute Aquatic Life µg/l	MO Acute Aquatic Life Use µg/l	EPA 304(a) CCC Chronic Aquatic Life µg/l	MO Chronic Aquatic Life Use µg/l	EPA MCL from SDWA µg/l	MO Public Drinking Supply µg/l	EPA Human Health Org +Water µg/l 10^{-6} Risk Factor	EPA Human Health Org ONLY µg/l 10^{-6} Risk Factor	MO Fish Cons. µg/l 10^{-6} Risk Factor
5.B NON-PRIORITY POLLUTANTS									
Tetrachloroethylene					5	5	0.8	8.85	9.0[1]
Nitrosopyrrolidine, N 930552							0.16	9.19	93

[1] Existing Criterion

TABLE 6.1
Lakes: Reduced Acreage (Triennial Review)

WATERBODY	CLASS	COUNTY	LOCATION	ACRES	New	Modified	Expln
Ben Branch Lake	L3	Osage	15/14,44N,08W	44		X	-1acre
Higginsville City Lake (S.)	L1	Lafayette	SW NE09,49N,25W	150		X	-73acres
Malta Bend Community Lake	L3	Saline	25,51N,23W	5		X	-35acre
Roby Lake	L3	Texas	3,32N,11W	10		X	-11acres

TABLE 6.2
Streams: Reduced Segments (Triennial Review)

WATERBODY	MILES	FROM	TO	COUNTY	COUNTY2	New	Modified	Expln
Brush Cr.	9	Mouth	30,43N,22W	Benton			x	-0.2mi,
Brushy Cr.	1	Mouth	05,40N,20N	Benton			x	-0.2 mi
Long Br.	5	Mouth	06,45N,23W	Pettis	Johnson		x	-1.7; C toP;
Mill Cr.	1	Mouth	03,37N,10W	Phelps			x	-0.5mi